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THE USE OF ORAL REHYDRATION THERAPY
IN THE MANAGEMENT OF DIARRHOEAL
DISEASES IN A PERI-URBAN SLUM
OF NAIROBI, KENYA. 1

BY SOPHIE OCHOLA

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DECLARATION

I, Sophie Atieno Ochola hereby declare that this thesis is my original work and has not been presented for a degree in any other University.

S. Ochola.

Sophie A. Ochola (Mrs)

CANDIDATE

This thesis has been submitted for examination with our approval as University Supervisors.

1) N. Kielmann, 11.7.90

Nandita Kielmann (Mrs)

Lecturer, Unit of Applied Human
Nutrition, Dept. of Food
Technology & Nutrition.

2) K. Kogi-Makau

Dr. Wambui Kogi-Makau

Lecturer, Unit of Applied
Human, Dept. of Food
Technology & Nutrition.

DEDICATION

This thesis is dedicated to my husband Zachary and my children Alvin, Brian, Vincent and Chris.

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Sophia
.....

Sophie A. Ochola

.....19-7-1990.....

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ABBREVIATIONS

ORS	Oral Rehydration Solutions
SSS	Home made Salt and Sugar solutions
ORT	Oral Rehydration Therapy
CDD	Control of Diarrhoeal Diseases
KAP	Knowledge, Attitudes and Practices
WHO	World Health Organization
PHC	Primary Health Care
UNICEF	United Nations International Children's Educational Fund
Mls	Millilitres
DD	Diarrhoeal Disease
*Kshs	Kenya shillings
KNH	Kenyatta National Hospital
Mmols	Millimols
IDH	Infectious Diseases Hospital
GES	Glucose Electrolyte Solutions
MSS	Maize Salt Solutions
CBS	Central Bureau of Statistics
USAID	United States Agency for International Development
CIDA	Canadian International Development Agency
DANIDA	Danish International Development Agency

DEFINITIONS

1. ORS: Refers to the standard WHO and UNICEF recommended formula in a pre-packed dry form ready to be reconstituted when required as well as the home-made salt sugar solution.
2. ORS users: refers to those who have used ORS at least once in the past.
 - a) Current users of ORS: Refers to mothers who have used ORS at least once in the past and intend to continue using it in the future.
 - b) No longer using ORS: Refers to those mothers who have used ORS at least once and do not plan to use it in the future.
3. ORS non-users: refers to those mothers who have heard of ORS but have never used it.
4. Index child for the first phase of the study: refers to the child, aged between 6-36 months who last experienced a diarrhoea episode in the identified household.
5. Index child for the second phase of the study: refers to child between 6-36 months of age who experienced a diarrhoea episode during the study period and who was observed for two days.
- 6) Index mother for the first phase of study: refers to the mother of the child aged 6-36 months

who last experienced a diarrhoea episode in the identified household.

7). Diarrhoea: is defined as three or more watery stools per day (WHO definition)

8). Use of ORS: defined in terms of:

- a) frequency of ORS administration
- b) timing of initiation of oral rehydration therapy
- c) volume of ORS administered per day
- d) preparation of oral rehydration solutions

9) Multiple responses: Where a respondent gives more than one answer to a specific question.

10) ORS use rate: The percentage of diarrhoea disease episodes in children under five years of age treated with ORS (WHO definition).

11) ORS access rate: The percentage of population having reasonable access to a provider of ORS who is trained in its use and receives adequate supplies (WHO definition).

12) Mothers' Disposable Income: Refers to the amount of cash income that is available to the mother for managing the household.

ABSTRACT

Oral Rehydration Therapy can play a significant role in reducing both mortality and morbidity associated with diarrhoeal diseases. In spite of worldwide efforts to promote the use of Oral Rehydration Therapy, usage rates remain below 4% and success rates are estimated at 33%.

In order to identify factors influencing mothers' decision to use or refrain from using oral rehydration solutions, a cross-sectional investigation was carried out in a peri-urban slum of Nairobi, Kenya. The study examined mothers' knowledge of, attitudes towards and practices in the use of Oral Rehydration Therapy as well as their knowledge of diarrhoeal diseases. The study undertaken involved two phases. First, (411) mothers with children between 6 and 36 months of age were interviewed. Information on their socio-economic background and their knowledge of, attitudes towards and practices in the use of Oral Rehydration Therapy was collected. In the second phase, mothers administering oral rehydration solutions to their children were observed in order to compare previously collected recall information to actual practice.

The study findings showed that the majority of mothers (75%) viewed diarrhoea as a dangerous disease. However, only 25% were able to correctly indicate its causes while 48% were unable to mention more than two signs of dehydration.

Awareness and usage rate of home made salt and sugar solutions was higher than those made from prepackaged oral rehydration salts. The majority (77%) of the mothers gave recipes for home made solutions which would result in hypertonic mixtures, while 64% indicated methods of preparation from prepackaged mixtures leading to hypertonic solutions. The solutions were often administered incorrectly; 28% of the mothers administered oral rehydration solutions in amounts that would not prevent or alleviate dehydration while 70% administered it at a lower frequency than what is recommended. One third of the mothers initiated the therapy after the first day of illness. Mothers' attitude towards Oral Rehydration Therapy was generally positive, although the majority of them did not demonstrate a clear understanding of its role in the management of diarrhoeal diseases.

Maternal characteristics (educational level, age, knowledge and understanding of the role of Oral

Rehydration Therapy in the management of diarrhoea) had a positive impact on the correct use of Oral rehydration therapy. Older mothers tended to be more knowledgeable on Oral Rehydration Therapy and were more likely to administer it more frequently and efficiently than younger and less knowledgeable mothers. Furthermore, mother's educational level, regardless of her age had a statistically positive correlation with her understanding of the role of Oral Rehydration Therapy and the importance of correct timing of initiation of treatment.

Detailed case studies carried out in the course of the investigation indicated that mother's perceptions on the aetiology of diarrhoeal diseases influenced their decision to use or refrain from using Oral Rehydration Therapy.

The importance of further studies to explore and understand cultural factors associated with mothers' perceptions of diarrhoeal diseases; its aetiology, consequences and treatment is recommended. In addition there is need to carry out an evaluation of the health education programmes directed towards use of Oral Rehydration Therapy.

CHAPTER ONE

1.1 INTRODUCTION

Childhood diarrhoea accounts for over five million deaths annually, and in many cases is the single most important cause of deaths in young children. Moreover, diarrhoeal diseases contribute to vulnerability of children to other infections e.g., through its interaction with malnutrition.

One of the significant reasons for high mortality rates following diarrhoea is the level of mother's understanding of the importance of fluid replacement, during the disease. Most infant and child deaths due to diarrhoeal diseases could be avoided through the use of oral rehydration therapy (ORT), a simple, inexpensive home treatment involving fluid replacement through oral intake of a solution of table salt and sugar or commercially packaged rehydration salts. Given the magnitude of the health problem and the cost-effectiveness of the intervention, it is not surprising that large scale international efforts have been directed to the promotion of ORT.

International attention to the promotion of ORT for childhood diarrhoea began with the establishment of the World Health Organization (WHO) programme for

Control of Diarrhoeal Diseases (CDD) in 1978. The objectives of the programme are to reduce mortality due to diarrhoea in infants and children worldwide by 50% and to reduce morbidity and malnutrition associated with diarrhoea illness. The cornerstone of national programmes has been home treatment of acute diarrhoea with oral solutions of packaged rehydration salts or a mixture of household sugar and salt solution (SSS) to replace body fluids and to prevent dehydration.

Since the early 1980's, ORT has been the dominant focus of international health programmes, involving numerous agencies and organizations, most notably United Nations International children's Educational Fund (UNICEF) and United States Agency for International Development (USAID). More than 100 countries currently have national CDD programmes with support from various governmental, bilateral and private health sources (WHO, 1981b: 1985).

The importance of ethnomedical knowledge for the design of successful health interventions seems to have been more clearly acknowledged in the field of diarrhoeal control. In the case of ORT, the health practice involves the use of a consumable "technologic" product which requires careful study of

local knowledge, attitudes and practices for the design and implementation of intervention programmes (Coreil and Mull, 1988). Social marketing messages must first and foremost be based upon an understanding of the target group's perceptions of the illness (Manoff, 1985).

1.2 STATEMENT OF THE PROBLEM

Despite the fact that fluid loss can be easily corrected by use of ORT, 60-70% diarrhoeal deaths are still caused by dehydration (WHO, 1985). The effective use of ORT is interfered with by; cultural beliefs, maternal knowledge and attitudes as well as scarcity of economic resources. Additional factors include lack of political commitment by some governments to introduce an ORT programme, poor organization and management of such programmes, lack of both community participation and dissemination of information. For example, one of the reasons for early failure of ORT in Menoufia province of Egypt in the late 1970's, was the rumour linking the distribution of ORS packets to promotion of contraceptive measures (Gabr, 1985).

Problems have also been reported in the preparation of ORT solutions as well as its timely and proper administration. Many mothers experience difficulty in performing the seemingly simple operation of

preparing home made SSS or packaged mixtures (Mull and Mull, 1988). To be effective, efforts to popularize ORT must be based upon a better understanding of the interaction between knowledge, skills and beliefs which are embedded in ORT and those which mother(s) possess from previous educational and social experiences (Eisemon et, al., 1987).

Despite a rise in global ORS usage rates over the past years, they remain below 4% and success rates are estimated at 33% (Mahler, 1985). It is therefore imperative to look into what determines the use and non-use of ORT and the local constraints that impede or retard effective use of ORT within a given community. It is equally important to find out whether those mothers who are using ORT are doing so correctly.

Observational studies, aimed at monitoring of feeding and treatment during diarrhoeal episodes, as done by Bentley (1988) in North India, are crucial although very time consuming. Preparation of rehydration fluids in the home should be checked and re-checked for accuracy (Mull and Mull, 1988). This body of knowledge seems to be lacking and specifically so in urban slums in Africa. This study aspires to fill, to a certain extent, this gap in knowledge by

identifying the determinants of ORS use as well as determining the practices in the utilization of ORS in an urban slum community, of Nairobi, Kenya.

With this background information in mind the following research questions were formulated:

- 1) What is the mothers' knowledge, attitudes and practices in the use of ORS?
- 2) What factors influence mothers' decision to use or not to use ORS?
- 3) What is the aetiology and dangers of diarrhoeal diseases as perceived by mothers?
- 4) What is the mothers' ability to recognize signs of dehydration?

A cross-sectional study carried out in two phases was chosen in an attempt to answer the previously stated research questions. Phase one consisted of a survey in which two questionnaires; one on socio-economic status of the mothers and the heads of households and the other on mothers' knowledge, attitudes and practices (KAP) in the use of ORS were administered in 411 households. The second phase of the study involved the observation of current ORS users (see p.xviii) whose children suffered from diarrhoea during the study period, in order to verify the mothers' reported utilization of ORS.

1.3 JUSTIFICATION OF THE SELECTION OF THE STUDY SITE.

A major demographic feature of recent times has been the migration from the rural areas to the city in search of a better life. Most of the migrants end up in the peri-urban slums, where they live in overcrowded, impoverished surroundings with inadequate sanitation and supply of clean water.

In Nairobi, as well as in many other cities in the developing world, the urban poor are rapidly increasing in number. The urban poor are therefore, increasingly becoming, an important burden and challenge to the civil administration, especially to their nutrition and health services. Most of the children seen and admitted at Kenyatta National Hospital, suffering from diarrhoeal diseases are from the slum areas and in particular Kibera, a peri-urban slum area of Nairobi (Ministry of Health Officials, 1988). Kibera was chosen as the study site with this background knowledge, coupled with both community's willingness to allow an investigation and the easy accessibility to the area.

1.4 EXPECTED BENEFITS OF THE STUDY

It is expected that by highlighting gaps in maternal knowledge, attitudes and practices as well as

identifying those factors which influence a mother to use or not to use ORS, this investigation might aid in improving the quality of Nutrition and Health Education given to mothers. The findings of this investigation are expected to be of use primarily to the Ministry of Health, city planners, social workers and non-governmental organizations whose programmes focus on improving child health and survival, specifically in peri-urban slum areas.

1.5 STUDY OBJECTIVES AND SUB-OBJECTIVES

1.5.1 To determine mothers' knowledge, attitudes and practices in the use of ORT.

1.5.1.1 To determine mothers' knowledge on the use of ORS for management diarrhoea.

1.5.1.2 To determine mothers' attitude towards using ORS for management of diarrhoea.

1.5.1.3 To determine mothers' practices in the use of ORS during diarrhoea episodes in children in terms of; correct preparation methods, volume of solution administered, frequency and timing of administration.

1.5.2 To determine mothers' knowledge on diarrhoeal diseases.

1.5.2.1 To determine mothers' perceived aetiology and dangers of diarrhoeal diseases.

1.5.2.2 To determine mothers' ability to recognize signs and symptoms of dehydration in their children.

1.5.3 To identify factors which influence mothers' decision to use or refrain from using ORS during diarrhoeal disease episodes in their children.

1.5.3.1 To determine socio-economic factors that are related to mothers' decision to use or to refrain from using ORS.

1.5.3.2 To determine the circumstantial factors that are related to mothers' decision to use or to refrain from using ORS.

1.5.3.3 To determine the characteristics of diarrhoeal disease episode that are related to mothers' decision to use or to refrain from using ORS.

1.6 HYPOTHESES

1.6.1 Knowledge of correct function of ORS, frequency of ORS administration as well as the correct timing of its administration is influenced by mothers' formal educational level.

1.6.2 The majority of the mothers in the study population are not using ORS correctly (see p.xviii).

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Childhood diarrhoea accounts for four to five million deaths annually (world wide), and in many areas is the single most important cause of death in young children. Moreover, diarrhoea contributes to an even greater share of morbidity due to associated malnutrition. In the developing world, case fatality rates are highest in infants and children of upto one year old. Diarrhoea associated morbidity rates are highest in the six to eleven months age group, which corresponds to the weaning period. Children under five years experience an average of two to three episodes of diarrhoea per year, with a range from two to twelve episodes [Synder and Merson, 1982].

In Kenya, data from 1975 mortality survey show enteritis and other diarrhoeas account for 9% of all deaths. Diarrhoeal diseases make up 29% of all deaths from infections and parasitic diseases, which make up 31.4% of all registered deaths [Ministry of Health, 1975a]. The national average number of episodes per child per year is four with a two-week incidence rate of 13.6% [CDD, 1987].

2.2 THE AETIOLOGY OF DIARRHOEA

Diarrhoea can be defined as a condition in which stools are passed more frequently and are more loose or watery than is usual for the person. Three or more watery stools in a day can be considered as DD [WHO, 1981a]. Acute DD is caused by infectious enteric pathogens through a faecal-oral route. The sources of contamination include the general environment, cooking and eating utensils and contaminated food and water.

Cultural context of the aetiology of diarrhoea

Studies have shown that local perceptions of health and illness vary across different cultures. Indigenous beliefs about health and disease are culturally shaped and do not follow scientific arguments. The cultural context in which diarrhoea illness occurs is often complicated, making it difficult to translate biomedical knowledge into effective health policy [de Zoysa et. al., 1984: and Weiss, 1988]. Health professionals who understand local interpretations of cause, course and treatment of diarrhoea illness are better able to communicate with the people they serve [Weiss, 1988].

Despite the importance of the knowledge of the cultural perceptions of diarrhoea, few studies seem

to have addressed this issue. In rural North India, diarrhoea is believed to be caused by dietary factors, the physical environment and hot/cold system of humoral balance. Dietary factors include "bad food", overeating and the physical environment includes hot or cold weather. The humoral balance system consists of eating "hot food" or drinking "hot breast milk". Teething was also perceived to be a major cause of diarrhoea [Bentley, 1988]. In rural Pakistan, most diarrhoeas are also believed to have causes related to the 'humoral balance system'. Heat-related concepts predominate [Mull and Mull, 1988] and these are also perceived as being the major cause of childhood diarrhoea in rural Sri Lanka. Other factors, such as 'evil eye' and increased worm load are also believed to cause diarrhoea [Nichter, 1988]. In the urban setting of Goa, beliefs on causation of diarrhoea were related to the child's or mother's diet. Certain foods, for example, meat, fish, eggs and cashew nuts were believed to cause diarrhoea in the child. Cold climate as well as factors related to superstition were believed to cause diarrhoea [Srinivasa and Emelita, 1983].

In rural Zimbabwe, the major cause of diarrhoeal illness was perceived to relate to the child's physical environment such as drinking of dirty water, eating contaminated food and change in climate. A

few people perceived the causation of diarrhoea to be related to the child's social environment; for example sexual relationship of the mother while she is still breast feeding and breast feeding during pregnancy [de Zoysa et. al., 1984].

In Kenya, in a study carried out among the Akamba, it was reported that diarrhoea was believed to be caused by "teething" specifically if it coincided with the time the child starts to crawl and walk. If it occurred at any other time then it was believed to be a "God sent sickness" because its cause could not be explained [Maina-Ahlberg, 1979].

A survey done in Kibwezi, Kenya, revealed that 50% of the respondents believed that diarrhoea was caused by ingestion of contaminated food. Other causes quoted included change of diet and teething. As many as 18% did not know the cause of diarrhoea. [Ferguson et. al., 1985].

2.3 PREVENTION AND CONTROL OF DIARRHOEAL DISEASE

Reduction in diarrhoea incidence is a major public health concern. It is this concern that led to the establishment of the WHO programme for Control of Diarrhoeal Diseases (CDD) in 1978. The objectives of the programme are to reduce diarrhoeal mortality in infants and children worldwide by 50% and to reduce

morbidity and malnutrition associated with diarrhoeal illness [Corell and Mull, 1988].

Prevention of diarrhoeal disease programmes include supply of clean water, proper sanitation, hygiene and nutrition education with emphasis on promotion of breast-feeding. For example, a hygiene intervention study in Bangladesh showed that an increase in hand washing reduced diarrhoeal attack rate [Clemens and Stanton, 1987; Stanton and Clemens, 1987]. However, such interventions are time-consuming and costly. To change people's behavior is a long-term process. This could explain why prevention of diarrhoea and dietary management during illness have been less emphasized [Corell and Mull, 1988]. In recognition of the complexity of the problem and the difficulty in establishing effective preventive programmes, the emphasis has been on case management of diarrhoea, rather than prevention. The cornerstone of national CDD programmes has been home treatment of acute diarrhoea with oral solutions or packaged rehydration salts or household SSS to replace body fluids and to prevent fatal dehydration.

The Kenyan CDD programme was first launched in November 1986 [CDD Programme, 1988]. Its two broad objectives are to reduce child mortality by 30% and morbidity by 20% in a five year period. The main

strategy of the five year programme is effective case management and promotion of early home treatment of diarrhoea. The main emphasis here is on the use of ORT specifically the WHO glucose-electrolyte solution [CDD Programme, 1988].

The Kenyan Ministry of Health has prohibited the use of home-made SSS with effect from May 1988 [CDD Programme, 1988]. The Ministry took this stand because many mothers apparently prepare hypertonic solutions, as evidenced by the number of children who have died from O. presented with hypernatraemia, at various Health Institutions in the country [CDD Programme, 1988]. Mothers are now encouraged to use home fluids such as cereal fluids, coconut water and fruit juices in place of SSS although there is no official policy on recommended fluids. Other areas of case management include proper assessment of the degree of dehydration and treatment through the use of intravenous fluids and drugs where necessary.

The second strategy which is given less emphasis, is the development of preventive measures which include improved nutrition, proper and adequate weaning and feeding during diarrhoea, improved water supply and sanitation, and immunization especially against measles [CDD Programme, 1988].

2.4 THE DEVELOPMENT OF ORAL REHYDRATION THERAPY

ORT, in the form of salt-sugar solution, was first developed in Britain in the 1830's but it was not until the 1960's that the importance of sugar in the solution was established [Parker et. al., 1980].

The use of ORT expanded in the late 1960's and early 1970's as research revealed its wide applicability. Nalin and his colleagues [1968] demonstrated clinically for the first time that ORT could maintain hydration in adult cholera patients after rehydration by intravenous therapy. The oral fluids, when given early, were proved to rehydrate patients, as well as maintain hydration, even in cases involving acidosis. [Cash et. al., 1970]. During the 1971 cholera epidemic in Bangladesh, the utility of ORT for treatment of diarrhoeal dehydration was conclusively demonstrated [Parker et. al., 1980].

LANCET (1978) has described ORT as follows:

"The discovery that sodium transport and glucose transport coupled in the small intestine so that glucose accelerates absorption of solute and water was potentially the most important medical advance this century".

The scientific basis of ORT is quite simple; to replace the fluids and electrolytes lost during

diarrhoea and to keep the patient alive without attempting to cure the diarrhoea. The treatment is administered in the form of ORS, which is a solution of salts and sugar in water. ORS is fed continuously to the patient during the diarrhoea episode. This technology has replaced the need for intravenous therapy, a costly treatment available only in hospitals and clinic settings and restricted in practice to only qualified personnel. ORT does not carry the risk of infection as in the case of intravenous rehydration, which carries some risk of needle-introduced infection. This technological break-through offers possibilities for reducing the number of deaths in children because it transfers rehydration from a clinical setting to the level of the community. This transfer is important because mothers can participate in prevention of dehydration through early treatment in the home [Parker et. al., 1980].

Several studies have demonstrated the therapeutic effectiveness of oral rehydration therapy when used at community level. In rural Bangladesh, diarrhoea mortality and case-fatality rates dropped dramatically with use of oral rehydration solutions in the form of glucose-electrolyte solutions [Rahman et. al., 1979]. In rural Egypt it was demonstrated that mothers were able and willing to

demonstrated that mothers were able and willing to take over the responsibility of early recognition and management of diarrhoea illness. This study also showed a dramatic reduction in diarrhoea mortality rates as a consequence of the use of ORT, specifically the home prepared salt and sugar solution [Kielmann et. al., 1985].

2.4.1 Oral rehydration solution (ORS)

Knowledge of the advantages of ORS over Intra-venous rehydration led to the sustained search for the development of an efficacious oral solution. After the discovery of the mechanism of sodium transport, an effective formula was developed. The formula that is currently recommended by the WHO is shown in table 2.1

Table 2.1 Oral rehydration solution formula *

Sodium chloride	3.5g
Trisodium citrate, dihydrate	2.5g
or	
Sodium bicarbonate	2.5g
Potassium chloride	1.5g
Glucose anhydrous	20.0g
or	
Glucose monohydrate	22.0g
or	
Sucrose	40.0g
Water	1 litre

*Source: WHO, 1985.

In the formula, glucose or sucrose is the carbohydrate substrate that enhances sodium absorption. The trisodium citrate dihydrate or bicarbonate helps to inhibit acidosis which often occurs during diarrhoea and is usually the cause of nausea that leads to loss of appetite. Potassium is useful, especially in cases of severe diarrhoea as it enhances the effectiveness of the sugar and salt.

The dry ingredients are packaged in aluminum or plastic packets. Oral rehydration salts packets are

internationally distributed, primarily by UNICEF, although many countries have now started production at local level [Parker et. al., 1980].

The major issue today is not the composition of the ORS packets but rather the provision of essential supplies to all who require them. To provide the needed six packets per child under the age of five years per year to all developing countries (excluding the Peoples Republic of China) would require 24,000 million packets annually. UNICEF is currently producing 24 million packets. This amount is less than the 50-60 million packets estimated as necessary for Egypt alone. Providing a continuous supply of prepackaged salts is a major important constraint for national programmes.

Another major constraint for national CDD programmes is cost. Health ministries in most developing countries cannot afford prepackaged ORS supplies for every family. For many developing countries the cost of providing six packets of ORS per child per year would amount to 10-20% of the total health budget [Parker et. al., 1980].

The rate of global access rates to ORS reached 59% in 1986 and ORT use was 23%. While it is probable that the programme may achieve its 1989 target of 80%

access rate to ORS, it is less likely that it will attain its objectives of 50% use of ORT, without considerable increase in effective training and communication activities [WHO, 1988].

In Kenya, ORS packets are received mainly through donor organizations such as CIDA, DANIDA and UNICEF. In addition, the government has contracted an overseas firm to manufacture and package ORS for use in Kenya [CDD Programme officials, 1989].

2.4.2 Home prepared salt and sugar solutions

One answer to the twin problem of cost and distribution is to encourage home preparation of an ORS consisting of only sugar and table salt. Since sugar and salt are available in most households and since potassium and bicarbonates may not be essential in the early stages of diarrhoea, several programmes are experimenting with home-mixed solutions [Parker et. al., 1980]. It has been argued that home-made salt-sugar solutions, has also got the added advantage of creating autonomy and encouraging self-sufficiency [Nations and Rebhun, 1988].

This approach, however, raises two concerns. Firstly, will the solutions be accurately mixed? If too much salt is used, the solution may be dangerous in that it may cause hypernatremia to the child. If too

little salt, it may be ineffective. Secondly, sugar and salt may not be effective in the absence of potassium and bicarbonates especially in cases of severe dehydration. These concerns have led to the controversy as to whether SSS should play a key role in any national or regional diarrhoea management plans [Parker et. al., 1980; de Zoysa et. al., 1984 and WHO, 1986].

More than 20 different SSS recipes have so far been suggested and preparation methods include hand measures (e.g. "pinch" and 'scoop') household spoons (metallic or home-made), and manufactured double-ended plastic spoons. Each of these methods has advantages, but the proper use of all of them requires considerable training of health workers and subsequently mothers as well as the availability of salt and sugar [WHO, 1985].

Considerable problems have been associated with the preparation and use of salt-sugar solutions. These include the uncertain availability and variable quality of sugar and at times salt, lack of suitable utensils for measuring the ingredients, and most important, the difficulty in educating mothers to learn, retain and use the skills required for its correct preparation and administration have also been reported [WHO, 1986]. The availability of sugar

and/or salt versus appropriate 'home-available fluids' or rehydrants is a debatable issue. Where home fluids are already in use, the promotion of these fluids may be a better social marketing strategy than the salt-sugar solution [WHO, 1986]. (See section on Home available fluids below)

2.4.2.1 Efficiency of home prepared salt-sugar solutions

A few studies have been carried out to determine the extent to which the fears concerning the home prepared salt and sugar solutions should be a major public health concern.

Kielmann and his colleagues [1985], working in rural Egypt demonstrated that salt-sugar solutions together with potassium containing fruits and vegetables or, in their absence, tea, can serve as a temporary replacement of, the more costly and less readily available pre-packaged ORS.

Another study conducted in a hospital setting in Nigeria also demonstrated the effectiveness of the home prepared salt sugar solution. The findings of the study indicate that SSS, although an incomplete formula, can be effectively used in the management of acute diarrhoea at home, provided it is instituted early and complemented by continuous feeding [Okaehialam, 1989].

2.4.2.2 *Preparation of salt-sugar solution*

A laboratory analysis of serum sodium and potassium of children to whom ORT had been administered, indicated that mothers in rural Bangladesh are able to prepare safe and effective SSS under close supervision [Synder et. al., 1982]. A study carried out in rural Egypt also demonstrated that mothers are capable of preparing the SSS correctly but that it requires patient and repetitive training [Kielmann et. al., 1986].

A study carried out in rural Zimbabwe also showed that 48% of the mothers were able to prepare SSS within a safe and effective range of sodium content (30-100 mmol/l), although the ability to recall the correct recipe decreased as the interval of time since training became longer [de Zoysa et. al., 1984].

Other studies have indicated that mothers have problems in preparing the SSS. A study carried out in Jamaica demonstrated that the home-made oral rehydration solutions often contained salts in dangerously high amounts. The osmolality of the glucose/water solution was especially high because mothers prepared the solution according to taste.
+
Jamaicans prefer very sweet and salty food. Only 46% of the mothers made correct solutions. It was also

found that the type of sugar used likewise influences its concentration in the rehydration solution [Erasmus and Harland, 1981].

In a study conducted in rural Pakistan, it was discovered that many of the methods of preparing SSS, recited by mothers would lead to hypertonic solutions which could be dangerous to the child's health [Mull and Mull, 1988]. In a study conducted in rural Bangladesh, it was found out that mothers' ability to prepare a safe solution appeared to deteriorate about six months after training [Mushtaque et. al., 1988]

Analysis of home-made solutions prepared by illiterate mothers in Nigeria showed that 60% of them made accurately composed solutions. All the rest (40%), however, made hypertonic solutions. Possible causes of error included salt type, spoon size and leveling techniques [Nwoye et. al., 1988].

In Kenya, it appears that only two studies have been conducted to determine mothers ability to prepare SSS. In a survey carried out in Kibwezi, Machakos district, mothers were asked to recite the recipe for preparing SSS. Less than half of the mothers quoted proportions of ingredients that were approximately correct. At least 14% of the mothers quoted amounts

of salt likely to cause hypernatremia. This information was obtained retrospectively and it is not known whether this knowledge is applied in practice or not [Ferguson et. al., 1985].

In a more recent study, a laboratory analysis of glucose/electrolyte and SSS prepared by mothers in Kiambu district, was carried out in order to determine the influence of health education on mothers' ability to prepare safe and effective rehydration solutions. The findings indicated a wider variability in the composition of SSS than in the glucose/electrolyte solutions. The tendency to prepare rehydration solutions with sodium concentration greater than 100mmol/l was higher with SSS. The influence of health education was not evident in respect to SSS but differences were seen in the case of glucose/electrolyte solutions. It was thus implied that the fewer the number of precise measurements to be made, the more accurate a preparation is likely to be [Desai et. al., 1989].

2.4.2.3 Availability of Ingredients and Utensils for preparing SSS at home.

Few studies seem to have been carried out in order to determine the availability of ingredients and utensils necessary for proper preparation of SSS in the home. Kielmann et. al., [1986], found out that in

rural Egypt, granulated sugar and salt were available in more than 98% of the households interviewed.

In a study carried out in rural Zimbabwe, it was reported that 88% of the households had the utensils for measuring the ingredients required for preparation of SSS. In addition, sugar and salt was also available in 92% of the households. (de Zoysa et. al., 1984)

In a more recent study, carried out in rural Bangladesh, contradicting information was found. Infrequent availability of gur (unrefined sugar) that was recommended for preparation of SSS at home was reported. The availability of gur is seasonal and coincides with the harvest of sugar cane and date juice. Refined sugar is as infrequently available as gur. It was found that ORS was not used for all episodes of DD partly due to unavailability of gur [Mushtaque et. al., 1988].

2.4.3 Home available fluids

Home available fluids are appropriate for early home treatment of acute diarrhoea. These fluids are often prepared from boiled water thus ensuring safety for drinking and contains sodium and sometimes potassium, and a source of glucose, such as starches, that can facilitate the absorption of salts in the intestines.

They also contain other sources of energy. Two examples are rice water, often found in homes in Asia, and various soups, for example, carrot soup, often found in homes in North Africa. Other examples include coconut water and weak tea. Nevertheless, there is an urgent need to identify other appropriate "home-available fluids" for different regions of the world [WHO, 1985].

2.4.4. *Cereal based ORS*

In recent years, a lot of effort has been directed towards determining the efficacy of cereal based ORS. A few studies have indicated that cereal based ORS are as efficacious, or superior to glucose ORS. A longitudinal, community based investigation in rural Bangladesh, showed that children who had more than four episodes of diarrhoea and who were treated with rice-ORS showed better monthly weight gain than those managed on glucose-ORS. This finding suggests that cereal based ORS improves nutrition during diarrhoea [Bari et. al., 1989a]. The results of another community based investigation in rural Bangladesh showed that intervention with either rice-ORS or glucose-ORS is better in terms of recovery from diarrhoea but that rice-ORS seems to be more effective. [Bari et. al., 1989b]

The results of a clinical trial of rice powder base ORS versus glucose-ORS, revealed that the group treated with rice-ORS had a shorter duration of diarrhoea and greater mean weight gain in the first 24 hours. The mean amount of ORS intake, stool output and number of episodes of vomiting were lower on the rice-ORS group. Apparent superiority and likely low cost of rice-ORS suggest consideration of its widespread use [El-Mougi et. al., 1989].

In Kenya, a comparison of the efficacy of citrate containing glucose-electrolyte solutions (GES) versus maize salt solution (MSS) in the treatment of children with mild and moderate diarrhoeal dehydration and acidosis was carried out through a randomized trial. Both groups of children were similarly (successfully) rehydrated with similar improvement in metabolic acidosis and rapidity of rehydration in 24 hours. The setback to therapy with maize-salt solution was persistence of hypokalaemia only. Nevertheless, the children were clinically asymptomatic after the treatment. Therefore, carefully prepared maize-salt solution may be used successfully in mild dehydration as an alternative to the prepared glucose-electrolyte formula in the home situation, when the latter is unavailable [Kenya et. al., 1989].

2.4.5. *Super ORS*

Research to develop new and improved ORS is on-going. Recently, there has been much international enthusiasm about 'Super-ORS', a carbohydrate and amino-acid salt solution that appears to decrease stool output and duration of diarrhoea. Studies have demonstrated the feasibility of substituting amino-acids for glucose. Glycine, for example, actively supports sodium and water absorption in a manner similar to that of glucose [Kohde et. al., 1973].

In a recent study in Nigeria, Abiodun et.al., [1989], modified the WHO ORS by replacing part of the glucose with glycine, glycol-glycine or meltodextrine. There was no significant advantage of these solutions over WHO composition, in terms of frequency of stool, stool weight, duration of diarrhoea, weight gain and consumption of ORS.

However, if affordable and available preparations are discovered, this may undoubtedly prove popular with mothers.

2.5 KNOWLEDGE, ATTITUDES AND UTILIZATION OF ORT.

Relatively few studies have been conducted to determine mothers' knowledge, attitudes and practices in the use of ORT.

A study conducted in both urban and rural Haiti revealed that only 68% of the respondents interviewed were considered as being knowledgeable about ORT. The majority of the respondents did not understand oral rehydration therapy. Nevertheless, their attitudes towards the treatment was very positive. The majority of the respondents rated ORT as an effective treatment for diarrhoea regardless of the perceived mode of effect. About 50% of the respondents had used packaged or home made ORS in the past. Most users however, did not initiate the therapy on the first day of illness [Coreil and Genece, 1988].

In a study conducted in rural North India, ORS packet awareness was found to be very high (96%). This high awareness rate was probably due to an on-going ORT Intervention programme [Bentley, 1988].

The results of a study conducted in Sri Lanka showed that many rural and urban dwellers were not familiar with ORS. ORS was perceived as a medicine for diarrhoea, purification agent for the body and medicine providing strength when a child is weak. None of the respondents associated ORT with rehydration or noted any symptoms related to dehydration. The attitude towards ORT was also found to be very negative. Only a minority of the

respondents perceived, ORT as being an effective treatment. The usage rate was very low; ORS was administered as part of treatment in less than quarter of the diarrhoea cases which were encountered during the study period [Nichter, 1988].

In Bangladesh the results of an anthropological study on knowledge, attitudes and practices relating to ORS revealed an ORS awareness rate of 92%. However, ORS function was not understood by most respondents. The majority believed that ORS cures diarrhoea and only a minority mentioned prevention or treatment of dehydration. Slightly over half (59%) of the respondents had used SSS and 92% of the users were satisfied with the results. Many of the respondents reported that ORS is as good or better treatment than pills [Green, 1986].

A study conducted in Burma, showed a high acceptability rate of ORS in the community. ORS was administered in almost all cases (96%) of the diarrhoea episodes [Thane-Toe et. al., 1984].

An epidemiological evaluation in rural Bangladesh showed low usage rate of SSS (Loban-gur) for all the diarrhoea episodes monitored. This low usage rate was partly due to unavailability of sugar at household level [Mushtaque et. al., 1988].

In Kenya, only two surveys seem to have been done on management of DD at the household level. A national survey carried out in 1987, revealed that prepackaged ORS treatment rate in the two weeks preceding the survey was 25.8% while prepackaged ORS together with SSS was 43% [CDD, 1987].

The results of a survey conducted in Kibwezi, Machakos district showed that slightly over one third of the mothers interviewed administered ORS to their children when they had diarrhoea. Most mothers (91%) reported that they had been advised to use ORS and yet one third of those advised to do so, opted to take their children to the health facility, probably reflecting a lack of confidence in ORS as an effective treatment against diarrhoea [Ferguson et. al., 1985].

2.6 DETERMINANTS OF ORS KNOWLEDGE AND USE

It appears that few studies have been carried out to establish factors that influence mothers' decision to use or refrain from using ORS in the management of DD.

2.6.1 Maternal characteristics

2.6.1.1 Maternal Education

A study conducted in rural Bangladesh revealed that respondents who were more educated tended to know more about ORS [Green, 1986]. The same result was found in Haiti, where literacy correlated positively with knowledge on ORT. In Kenya, a study carried out in an urban hospital (Nakuru) also showed that educational level of the mother had a positive influence on ORT knowledge [Ndiku and Mandeavu, 1987]. However, literacy did not seem to have an influence on the use of ORT [Coreil and Genece, 1988]. Nevertheless, a study conducted in rural North India revealed that mothers with higher educational level tended to initiate rehydration therapy early [Bentley, 1988].

In a study conducted in Kajiado district, Kenya, Eisemon et. al., [1987] found that mothers with more years of formal education exhibit a profound knowledge on a range of appropriate treatments for diarrhoeal diseases. They also understand better the printed instructions for using ORT packets especially when the instructions reinforced what they had learnt at school.

2.6.1.2 *Maternal Age*

A study carried out in rural Bangladesh revealed that age was not associated with ORT use although there was a slight tendency for those reporting use to be younger [Green, 1986]. In Haiti, age of respondents was found not to be associated with either ORT knowledge or its utilization [Coreil and Genece, 1988].

In Kenya, the study conducted in Nakuru hospital, showed that there were no statistically significant differences in knowledge on ORT between young and older mothers [Ndiku and Mandebvu, 1987].

2.6.1.3 *Socio - Economic Status*

In Haiti, a study conducted to determine the characteristics of users and non-users, showed that respondents who were better off economically were more likely to have used ORT in the past, to have started rehydration therapy early and to have chosen the packaged ORS over the home method, for the most recent diarrhoea episode [Coreil and Genece, 1988].

2.6.2 *Diarrhoea episode characteristics*

In Haiti, results of the study by Coreil and Genece [1988], showed that the presence of a concurrent illness especially if it was thought to have caused

or exacerbated diarrhoea, correlated positively with ORT use. Younger children were likely to be treated with ORS and to be given ORS more frequently. Other episode characteristics such as perceived aetiology, severity in terms of the number of stools passed per day and duration did not have any association with ORT use [Coreil and Genece, 1988].

2.6.3 Circumstantial factors

2.6.3.1 Understanding of the role of oral rehydration therapy in the management of diarrhoea

A study conducted in rural North India revealed that mothers who understood ORT were more likely to initiate rehydration therapy early. Mothers who were aware of the mortality consequences of diarrhoea also tended to start rehydration therapy early [Bentley, 1988]. However, in Haiti, it was found that mothers who did not understand ORT were more likely to start rehydration therapy early. Early starters of oral rehydration therapy were also literate and were better off economically [Coreil and Genece, 1988].

2.6.3.2 Exposure to ORS

The Haiti study conducted by Coreil and Genece, [1988] also showed that the most significant predictor of ORT knowledge, use and choice of method was residence; urban versus rural setting. Respondents

who lived in town or along the highway knew more about ORT, had used the technique more often and more frequently selected the packaged mix over SSS. Those families which made more medical consultations were also more likely to have used ORT in the past.

It appears that very few studies have been carried out to establish the determinants of ORT knowledge and use, and therefore the findings of the studies quoted are not conclusive.

SUMMARY

It is evident, from the literature reviewed that ORT, if used correctly, plays a significant role in reducing both mortality and morbidity associated with diarrhoeal diseases. However, despite its proven efficacy, global access rates to ORS and usage rates are still disappointingly low [WHO, 1988]. In addition, according to the few studies conducted so far, knowledge on ORT seems to be low as a whole. Most mothers do not understand oral rehydration therapy neither do they prepare and administer the oral rehydration solutions correctly. Research is therefore needed to determine mother's knowledge, attitudes and practices in the utilization of ORT, and to establish the factors that influence mother's decision to use or to refrain from using ORT, in different regions of the world and specifically in

Kenya. This body of knowledge seems to be lacking and yet if these crucial issues are not addressed, then control of diarrhoeal disease programmes may fail to achieve their objectives. This study, therefore aspires to fill this gap in knowledge, to a certain extent, by providing this information on mothers living in an urban slum of Kenya.

CHAPTER THREE

DESCRIPTION OF THE STUDY AREA

3.1 SOCIAL GEOGRAPHY

3.1.1 *Location*

Nairobi, wherein the study site is located is the capital city of Kenya. It is situated at 5,800 feet above sea level and covers 684 square kilometres (Central Bureau of Statistics (CBS) 1986). The city is situated on latitude one degree south of the equator and longitude 36.5 degrees east of the Greenwich Meridian. It is the major centre of trade and other commercial activities for Kenya. It also houses most of the government and private sector offices.

Kibera division of Nairobi, which was the selected study site, is situated about five kilometres south west of the city centre. The area covers about eight square kilometres. The slum area where the investigation was carried out, constitutes half of the division.

3.1.2 *Population*

According to the 1979 Population Census, Nairobi had a population of 827,775 which accounted for 37% of the total national urban population (CBS, 1979).

It was projected that Nairobi's population would be 2 million by the end of 1987, since it has an inter-census growth rate of 5% (World Bank, 1983). Nairobi's population is growing at annual rate of 7.5% per year mainly due to rural-urban migration.

In 1979 Kibera/Woodley ward had an estimated population of 62,645 with a population density of 7,831 people per square kilometre but due to increased rural-urban migration the present population is estimated at about 250,000-300,000. The slum area's population constitutes about three quarters of this population (District Administrative Officials, 1988).

3.1.3 *Origin*

The slum area of Kibera is divided into nine villages namely; Makina, Kianda, Kambi-Murruu, Lindi, Laini Saba, Makongeni, Mashimoni, Kisumu Ndogo and Soweto.

The land where the slum dwellings are situated belongs to the Government. Originally the land was given to ex-Nubian soldiers who fought for the British in the First World War, and were first settled in 1912 (Temple, 1976). Since then, the Nubians occupied Kibera until other communities started joining them in large numbers in the early 1970's. At present the area has developed into a

slum (Anonymous, 1988).

3.1.4 *Housing*

Dwellings in the slum have to be built of temporary materials according to the law, as the government has been planning to re-develop the area since the Carter Land Commission of 1933 (Temple, 1976).

Houses are mainly temporary units and a few are semi-permanent in nature. The houses are made of iron sheet roofs and mud walls and floors. A small proportion of houses have cement plastered walls and floors. Most of the houses are divided into rooms of approximately 100 square feet each of which is occupied by a family, although sometimes two families may occupy one room. The houses are mainly owned by Nubian landlords. House rents vary from one area or village to another and also depend on the type of building materials used. The monthly rents vary from Kshs. 100 to Kshs. 300. The majority of the residents live in rented houses.

The Nairobi City Commission plans to improve housing conditions in the area and at the time of the study, the National Housing Corporation (NHC) together with the Department of Architecture, University of Nairobi, started a low cost housing programme in

Laini Saba village. Nevertheless, the majority of the residents interviewed felt that the new houses would be too expensive for them and that they might have to move.

3.1.5 *Occupation*

The residents are regularly, casually or self-employed. Most of the regularly employed residents are in lowly paid unskilled jobs such as watchmen or subordinate staff in both public and private sectors. Some of the residents are self-employed in small scale retail businesses dealing with essential household goods, food marketing and food service. The majority of the residents have a low or a subsistence income.

3.1.6 *Ethnic composition*

Despite the fact that Kibera area was originally reserved for Nubians, presently the majority of the residents come from Western and Nyanza provinces. The most predominant ethnic groups are Luhya and Luo followed by Nubians. Other ethnic groups are found in smaller numbers.

3.1.7 *Age distribution*

The Population in Kibera is young, the majority of the residents are between 15-30 years of age

(Anonymous, 1988) and are therefore in their most productive age. This young population could be explained by the fact that most of them are young people who have come to the city to look for jobs.

3.1.8 *Educational Status*

Most of the residents in this area have either no education or have only attained a primary school level of education. However, there is an increase in the number of slum residents who have attained secondary school level of education, especially amongst the heads of households. Due to the high unemployment rate, even those who have attained secondary level of education, can no longer procure high or medium income paying jobs easily. They can only procure lowly paying jobs or venture into small scale self-employment. Given the high cost of living and particularly the cost of renting houses in Nairobi, Kibera and other slum areas offer the cheapest accommodation.

3.2 INFRASTRUCTURE

3.2.1 *Transportation System*

Kibera slum area has a few murram roads and many foot paths. Because of lack of tarmack roads, no public service vehicles operate in the area. The residents therefore have to walk long distances in

to access public transport. There are two main bus routes which pass near the squatter settlement and link the area with the city centre and the rest of Nairobi. The routes also pass by the national government hospital (Kenyatta National Hospital) which provides medical services at a minimal cost. Currently the bus fare from the study site to the city centre and the hospital is Kshs. two and fifty cents.

3.2.2 *Telephone communication system*

The area is served by a few public telephone call boxes scattered in the squatter settlement, but a few economically better-off individuals have private telephones.

3.2.3 *Electricity supply*

As in the case of telephone, a few people in the study area have installed electricity in their houses from the line which passes near the District Administration Office in Makina village. These are generally houses which are semi-permanent in nature and are close to the road. Apart from the inability of the residents to pay the relatively high installation fees, houses which are of temporary nature do not qualify for electrical installations.

3.2.4 *Water supply*

The study area is well served with clean piped water. Some individuals to whom plots have been allocated have rented the City Commission water meters and therefore have their own supply of clean tap water at home. The City Commission charges such individuals according to the amount of water used. There are many water taps within the area and almost everybody uses tap water. The residents who do not have tap water in their houses purchase it from those who have. At the time of the survey twenty litres of water cost Kenya cents fifty throughout the study site. Most of the residents find this expensive and thus have to use water very sparingly. During the rainy season, some residents collect water from puddles and the nearby Multito river.

3.2.5 *Drainage and sewage disposal*

There is no organized drainage system, sewage or refuse disposal. Pit latrines are found scattered throughout the area. Garbage and human faeces especially of children are strewn all over the area and emit foul smells. A few make-shift bath shelters are shared by an average of ten households. Open drains with water from the toilets and from households are a common sight. Household waste is dumped in scattered heaps in between houses.

Non-governmental organizations such as Kenya Water for Health (KWAHO), a Danish volunteer group, have responded to the need for improved sanitation facilities by constructing pit latrines in Laini Saba village, identified as a priority area.

3.2.6 Shopping facilities

Kibera has very many open air markets, shops and kiosks scattered all over the area where many types of commodities are sold, including foodstuffs clothing, shoes, cooking utensils etc.

3.2.4 Churches and Mosques

There are a few churches belonging to various denominations scattered in Kibera. There is at least one church in every village. There is a large Mosque in Makina village which serves the Muslim community. Kibera thus seems to be fairly well served in this respect.

3.3 ESSENTIAL SERVICES

3.3.1 Education

Kibera slum is served by three primary schools, which are situated on the periphery of the area and are run by the City Commission. These schools cannot accommodate the entire school going child population.

Many children have to attend schools outside Kibera, necessitating the use of public transport. This increases the cost of education.

3.3.2 Health

Several health facilities are accessible to Kibera residents, comprising both government, where a minimal fee is charged for the services offered, and private health clinics where a higher fee is charged.

Among the government institutions are Lang'ata Health Centre, IDH Clinic, Ministry of Health Nutrition Clinic, Kenyatta National Hospital and Woodley Clinic, run by the City Commission.

There are many private clinics which offer general health care services. These include the Catholic Secretariat Clinic in Laini Saba village, Dr. Wanga's and Sunday Clinics among others. The costs for private Clinics range from Kshs.20 to 50/= for both consultation and treatment. Charges for adults are higher than those for children.

The available health services are inadequate. The main problem cited by the Medical Personnel at the Catholic Secretarial Clinic in Laini Saba and at Lang'ata Health Centre was too many patients to cater for adequately. In addition, Lang'ata health centre

(which is the largest institution that caters for this area), also cited an inadequate supply of drugs, which is sometimes so critical that no drugs of any kind are available for several days.

3.3.3 Community Organization

Administratively, Kibera is headed by a District Officer. He is assisted by a Chief and Sub-chief. Each of the nine villages is headed by a Kanu Youth Chairman who is assisted by a group of Kanu youth wingers and village elders. The youth group's responsibility is to report any disorderliness in the area. In addition, there is a Social Welfare Officer who works with this group of people. Given this structure, developmental and other social activities in the area are well co-ordinated.

3.3.4 Social and medical welfare

There are various non-governmental organizations working in Kibera with the aim of improving the social and medical welfare of the residents. The following are some of the organizations that are currently offering services in the area;

3.3.4.1 Undugu Society of Kenya

This group's activities are carried out in Siranga village where it offers an integrated programme,

comprising of a feeding component for malnourished children as well as income generating activities for mothers whose children are enrolled in the feeding programme.

3.3.4.2 Human Development Project

This project is under the auspices of the Church of the Province of Kenya and is situated in Makina village. It offers Child and Maternal welfare services. The charges for these services is Kshs. 20/= per visit.

3.3.4.3 Kenya Water for Health (KWAHO).

This is a Danish Volunteer Service which is currently working in Laini Saba village to help improve sanitation by constructing pit latrines for the residents.

Other non-governmental organizations working in the area include Bahati Family Helper, Chrisco Utwema Project which mainly offer Social welfare services and the Kenya Red Cross which offers medical services.

CHAPTER FOUR

RESEARCH DESIGN AND METHODS

SUMMARY

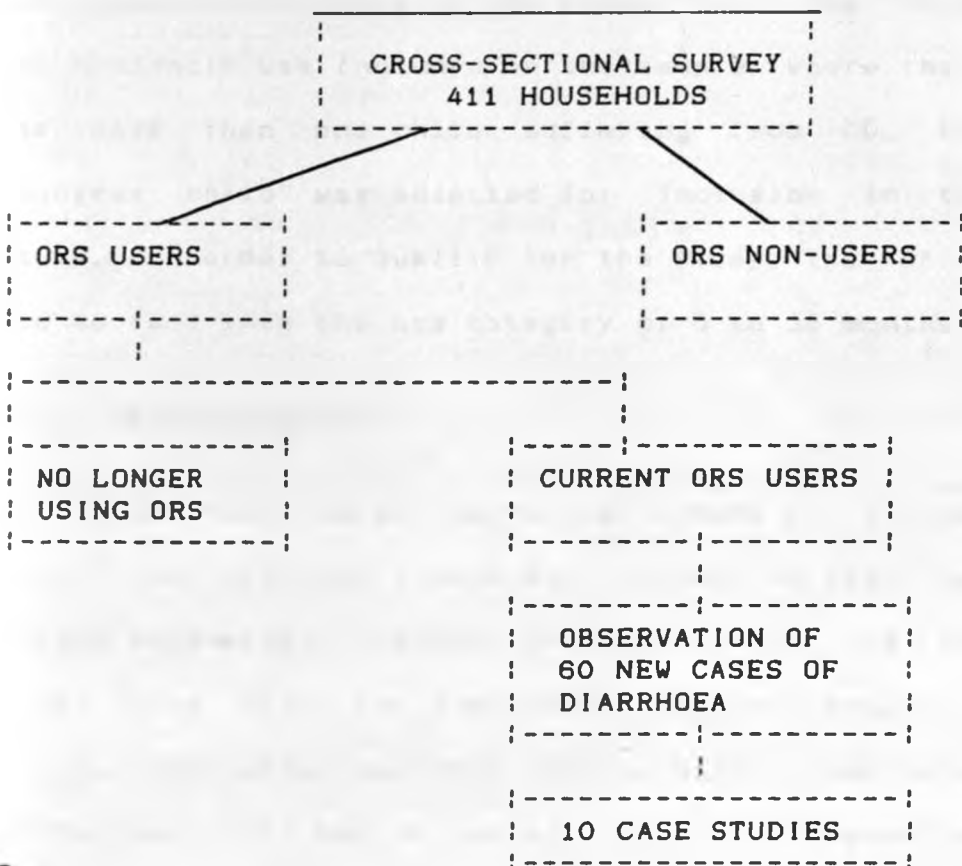
An investigation of cross-sectional design was carried out in two phases. The first phase consisted of a survey in which the mothers' knowledge, attitudes and practices in the use of ORS was determined. The second phase involved the observation of mothers whose children developed diarrhoea during the study period and who had been identified as current ORS users in order to verify the mothers' reported utilization of ORS by observation.

A community based cross-sectional investigation was carried out in Lindi village of Kibera, over a five month period beginning from January to May 1989. Phase one of the study consisted of a survey in which two structured questionnaires were administered to mothers in 411 households (see study design figure 4.1 p. 51). The data collected during this phase, was used to identify mothers as either ORS users or non-users; and subsequently categorize them into current users and no longer users of ORS. This was done in order to facilitate determination of factors which influence the use of ORS. Phase two of

the study involved the observation of current users of ORS whose children developed diarrhoeal diseases during the study period. The aim of this phase was to verify the mothers' reported utilization of ORS by observation considering that what the mother reports may not always be an accurate reflection of her behaviour. During the observation, an investigator visited the household and observed the mother's management of the diarrhoeal episode.

STUDY DESIGN

Figure 4.1 Study Design



4.2 DETERMINATION OF SAMPLE SIZE

Using an estimated annual diarrhoea disease of 4 episodes per child (CDD, 1987), 334 households were calculated as necessary for enrollment in the study. The sample was determined using WHO guidelines (see appendix 1 p. 143). In order to allow for attrition, identification and subsequent follow-up of an adequate number of diarrhoea incidences within a period of four months, the figure was increased by 20% resulting in a sample size of 400.

Sixty new cases of diarrhoea were followed during the observation phase of the study. Only one child per household was included in the sample. Where there was more than one child suffering from DD, the youngest child was selected for inclusion in the study. In order to qualify for the study, the child had to fall into the age category of 6 to 36 months.

4.3 SAMPLING METHOD

4.3.1 As indicated in figure 4.2, Kibera is divided into nine villages (see p.54). Lindi village was chosen purposively (because of accessibility) as the study site. Lindi is sub-divided into six areas; A to F, each area comprised 100 clearly demarcated plots. Each plot had an average of seven households. For sampling purposes, these areas were treated as

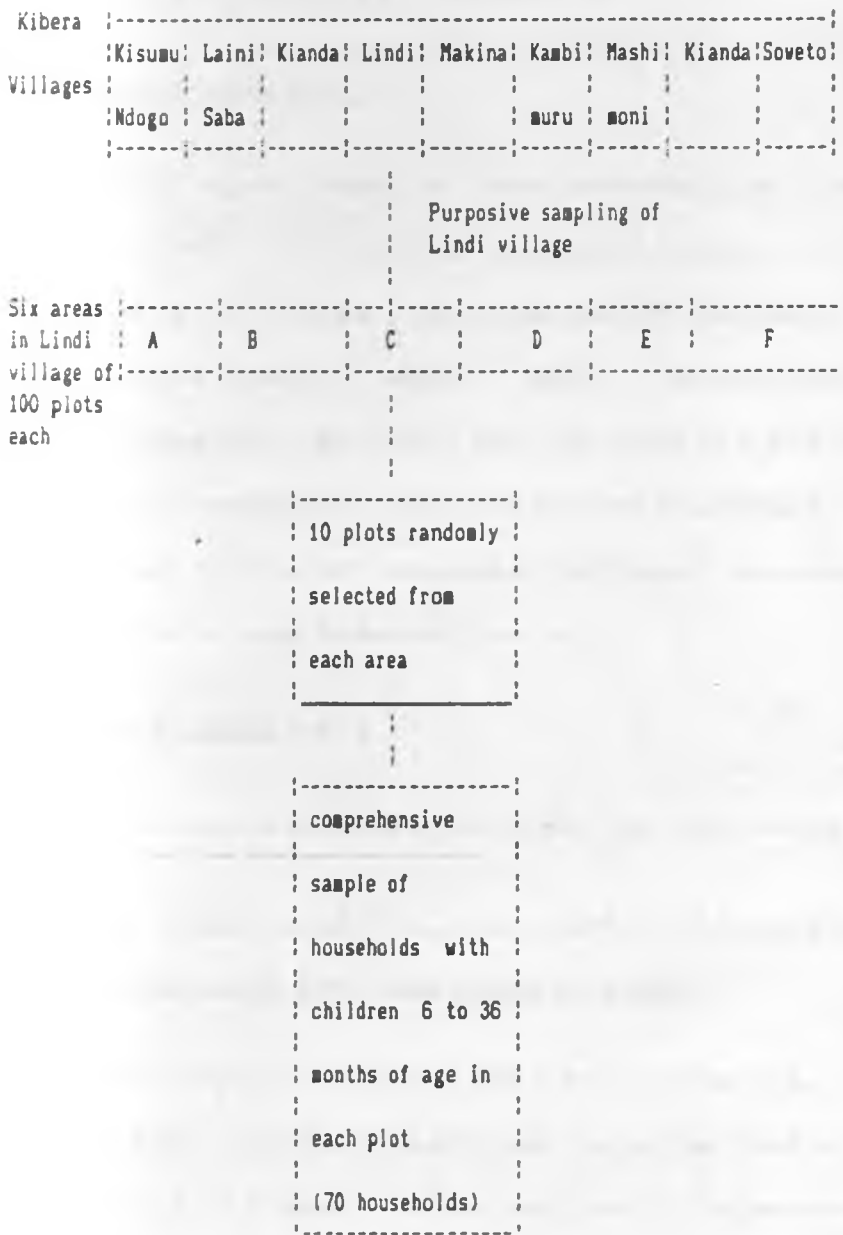
clusters. From each cluster, 10 plots were randomly selected. Plot numbers were written on pieces of papers, which were folded and tossed in a hat. The pieces of papers were picked to identify the plots for inclusion in the study. All households in the chosen plots (comprehensive sample) which had children between 6 to 36 months of age were enlisted in the study. In those clusters, in which the 10 identified plots did not yield the required number of households (about 70), subsequent selection of other plots was done randomly until the desired number was reached.

4.3.2 For the observation component of the study, any child suffering from diarrhoea who was detected on either the second or third day of illness was enlisted in the study. A weekly surveillance system was used to monitor children whose mothers had been identified as current ORS users. Cases which were detected after the third day were not enlisted because the diarrhoea episode was most likely improving and the mothers may not have been managing them the way they would have for a new case. Cases which were detected on day one of illness were only observed from the second day. This was because the pilot findings had shown that most mothers do not use ORS on the first day of episode because they were waiting to determine if it was a DD episode. Only

children aged between 6-36 months and whose mothers had been identified as current ORS users were included in the sub-sample.

Figure 4.2 Flow chart of Sampling Methods.

KIBERA, NAIROBI.



4.4 TOOLS OF INVESTIGATION

4.4.1 Phase 1

During the first phase of the study, two structured questionnaires (see appendix 2 p.152) were administered to mothers during a single visit to the selected households.

Questionnaire 1

This questionnaire was administered in order to collect descriptive background data. The questionnaire elicited information on household size and composition, age, sex, educational level, occupation, marital and residential status of household members. Information on household cash income from different sources and from various household members was also collected.

Questionnaire 2

This questionnaire covered the following areas:

a) Index child's (see definition p.xviii) social background and diarrhoea history.

Information on the index's child's age, characteristics of last diarrhoea episode suffered by the child in terms of colour and consistency of stool and duration of episode as well as the cause of

diarrhoea as perceived by the mother was collected. The respondent of this part were the mother or the principal caretaker of the child.

b) Index mother's (see definition p.xviii), socio-economic background and her knowledge on, attitudes towards, and her practices in the utilization of ORS.

Information on mother's age, educational level as well as her monthly disposable income was collected and was compared with the information collected in the first questionnaire. The questionnaire mainly covered mother's knowledge of, attitudes towards and practices in the use of ORS. The areas covered under knowledge included; mother's awareness of ORS, function of ORS and knowledge on the source of ORS packets. Attitude questions included mother's views of the usefulness of ORS and whether it should be used with other modes of treatment. Mothers' practices in the use of ORS were determined on the basis of her responses to questions on previous ORS use, preparation of ORS, its administration in terms of frequency and volume, time of initiation of rehydration therapy as well as the mother's intention to use ORS in the future. Questions on mother's practices of ORS were directed to its use during the last diarrhoeal disease episode experienced by the

child, in order to minimize any long-term recall bias. To determine the volume of ORS given during a 24-hour period, mothers were asked to show the equipment they had used and to indicate, by putting water in it, the amount of ORS given to the child in a day. This volume of water was then measured in millilitres.

c/ Mother's general knowledge on diarrhoeal diseases

During the interview, information on mother's understanding of diarrhoeal diseases in terms of their causes, and consequences as well as her ability to recognize signs and symptoms of dehydration and its potential dangers, were determined.

4.4.2 *Phase 2*

For the second phase of the study, a weekly surveillance was carried out in order to detect new cases of diarrhoeal disease. Once a new case was detected, a two-day observation was done starting on the second or third day of illness (see p.53). A ten hour observation, beginning from about 8.00 a.m. to 6 p.m. was carried out for two days. During the observation, utilization of ORS in terms of timing and frequency of administration, volume of ORS administered, method of preparation as well as storage conditions of the prepared solution, were

determined. A sample of the prepared solution was collected for laboratory analysis of sodium content. Where it was observed that mothers added salt in levels that were likely to be dangerous for the child's health, a sample was collected for analysis and the mother stopped from giving the potentially harmful solution to the child. The mother was then taught through a demonstration how to correctly prepare ORS using the prepackaged packets. The use of SSS was discouraged in line with the Ministry of Health's policy. Where a child was very ill and the mother had not sought medical attention, she was advised to do so immediately and was excluded from the study. This was done because through additional advice, the mother's own management of the diarrhoea episode was interfered with hence the information was not valid for the study.

In addition, ten case studies were done in greater depth in order to highlight the decision-making process involved in the use of ORS. A purposive selection of cases was taken in order to exemplify the diversity of factors that may be involved in determining ORS use. For the case studies, ethnographic (in-depth) interviews and observation techniques were used. Detailed informal interviews on mothers' knowledge, attitudes and practices in

the use of ORS as well as on socio-economic and socio-cultural characteristics of the household were carried out. The information on socio-economic and socio-cultural characteristics of the household was deemed necessary as it is known to be important to the decision-making process in illness management. For these case studies, in addition to the two-day observation, a complete follow-up of the diarrhoea cases was done until the end of the episode. This was done through brief daily visits to the household in order to get a complete picture of the mother's management of the diarrhoea episode. Records were kept of complete treatment regime using ORS and any other treatment.

4.5 RECRUITMENT AND TRAINING OF FIELD ASSISTANTS.

From 20 candidates with secondary level of education, 8 were short-listed for training. After a two week period which included the piloting, six of them were selected and recruited as enumerators. These enumerators were fluent in both English and Kiswahili.

Training involved exposure to the concept of research, the objectives of the research as well as sampling procedures. General introduction to diarrhoeal diseases, its causes, dangers, prevention

and treatment were covered. A more detailed exposure to ORS use, its functions, administration and preparation was carried out. A demonstration of ORS preparation was done to ensure that the enumerators understood clearly the measurements of water and other ingredients used in the preparation of the solution.

The enumerators were also exposed to interviewing techniques, followed by a period of thorough review of questionnaires, question by question, in order to ensure that the intent of each question was well understood by all. The questionnaires were translated from English into Kiswahili (the language used for interviewing) and back into English in order to establish that the meaning of the questions had not changed. The enumerators then practised administering the questionnaire amongst themselves and then later in 26 households, (in groups of three) in the presence of the principal investigator. Each enumerator would be required to record the responses which were later compared.

In addition, six observations, lasting about half a day each, were done by the enumerators in groups of two in the presence of the principal investigator.

4.6 PILOT STUDY

The pilot phase was carried out as part of the training of enumerators. After a period of exposure to research objectives, interviewing techniques and thorough explanation of the management of diarrhoeal diseases and specifically the use of ORS, a two-week pilot study then followed. Twenty-six households were conveniently sampled from the neighbouring Makina village, which is also part of the Kibera slum area. The main aim of this study was to pre-test the questionnaires which were to be used in the main study, in terms of the respondents' comprehension of the questions and to obtain information on the expected responses for the open-ended questions. Thus the information that was obtained from the pilot study was used to re-structure the questions which were not well understood by the respondents and also for pre-coding of responses for ease of data analysis.

4.7 VALIDATION OF DATA.

The questionnaires were carefully checked by the Principal investigator on the day the information was collected, to detect any inconsistencies, errors or incompleteness. Any errors or omissions were discussed with the enumerators and then the household was re-visited the next day or as soon as

possible in order to make corrections.

4.8 DATA PROCESSING AND ANALYSIS

4.8.1 *Data processing*

Questionnaires were fully checked for missing data. Data cleaning went on simultaneously with the data collection. The questions which had not been pre-coded were coded during this exercise. Data was then entered into the computer using Data base 111 plus programme.

4.8.2 *Data analysis*

Simple statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS). Correlations analyses were carried out between the variables of interest in order to ascertain the variables which were related to knowledge and use of ORS. Discriminant analyses were also done among the independent variables which were associated with the outcome variables in order to identify the variables that may have some influence on knowledge and use of ORS.

4.9 LIMITATIONS OF DATA

4.9.1 *Income*

It was not easy to determine the cash income of household members especially that of the heads of households. The mothers (respondents) were either not aware of their husband's income or were not willing to disclose it. The data collected on income is therefore only a proxy indicator of the real situation.

4.9.2 *Characteristics of diarrhoea episode*

It was not easy to obtain reliable data on the diarrhoea episode characteristics that the index child last suffered from, for the first phase of the study. This was due to recall bias on the part of the respondents. Many mothers could not remember how frequently their children had passed stool, during the last DD episode.

CHAPTER FIVE

RESEARCH IMPLEMENTATION AND PROBLEMS ENCOUNTERED

5.1 PRELIMINARY VISITS

The Research Permit for conducting the study was procured in December, 1988. Visits were made to the District Office of Kibera Division to inform the administration of the intended investigation, and explain its purpose, objectives and activities.

Subsequently, a guided tour of the squatter settlement was conducted and Lindi village purposively chosen as the study site. A one-day guided tour of Lindi village by Kanu Youth Wingers was conducted. The purpose of this tour was to get acquainted with the area, to investigate the layout of the houses, and to determine how to handle unexpected occurrences.

The next step was recruitment of research assistants whereby an advertisement was put through the District Office and applicants interviewed. Three of the six assistants were Kibera squatter settlement residents while the other three were non-Kibera residents.

The assistants underwent a two-week training period during which the pilot study was carried out (see p.62). After piloting, sampling was carried out. If a child of a mother who had been identified as a current user of ORS developed DD, and was detected either on the second or third day of the episode, she was approached and if willing was included in the second phase of the study (see p.56).

5.2 PROBLEMS ENCOUNTERED

5.2.1 *Respondents*

Some of the respondents expected the research team to give treatment to their family members when ill. However, after explanation, most of them understood the aim of the activities. In fact, some of the respondents who were not co-operative at the beginning later approached the team and indicated a willingness to be included in the study. At the end, only 2.1% of the sampled and eligible households remained non co-operative.

At times it was difficult to recruit respondents because they were engaged in other activities. In such cases, the households were re-visited on weekends and respondents interviewed at their convenience. Mobility of the respondents also caused a slight problem. About 3% of the sampled households

either moved from one house to another or moved out of the village before being interviewed. This problem had been anticipated and therefore more households than was actually needed had been included in the sample.

5.2.2 *Weather*

During the rainy season, the ability to traverse the study area was restricted due to the extremely muddy conditions. At such times, very few households could be visited per day and this prolonged the survey period.

5.3 CONSIDERATIONS FOR THE FUTURE

Experience from this study has shown that more time to understand the area, community and the people is needed in order to gain their support and acceptance. It should also be noted that this is a needy community and expectations were high among the respondents. Caution, therefore, needs to be exercised so as not to create high expectations which cannot be fulfilled. In addition, creating high expectations among the respondents can limit or be detrimental to the work of future researchers in the area.

CHAPTER SIX

RESULTS

The results of the investigation are presented in two main sections. Section one deals with findings of Phase one while section two covers Phase two of the study.

SECTION ONE (PHASE ONE)

6.1 CHARACTERISTICS OF THE STUDY SAMPLE

The number of households included in the study was 411. Only 2.1% (9 out of 420) households initially enrolled in the study either refused to participate or moved out of the study site before they were interviewed.

6.1.1 *Household size and composition.*

The majority of the households (96%) were headed by males. The average household size was 5.1. This compares well with findings in Korogocho squatter settlement of Nairobi, as found by Maina (1988).

6.1.2 *Residential status*

The majority of the heads of households (96%) and their wives (86%) had been living in Kibera for at least three months prior to the study period.

However, most mothers had dual residency; rural and urban and thus tended to migrate between them.

6.1.3 *Occupation*

The majority of the heads of households (62.5%) were regularly employed, whereas 21.9% were casual workers and 12.7% were self-employed. Only 2.2% reported that they had no jobs.

Most of the mothers (85.2%) were housewives and not employed outside the home. Only a small proportion of the mothers (12.2%) were self-employed while only 1.5% were regularly employed and 1.2% were casual workers.

6.1.4 *Level of education attained*

About half of the heads of households (51.2%) had attained primary level of education while 42.5% had attained secondary level of education. Only 4.2% had no formal education and could neither read nor write.

Over half (59.3%) of the mothers had completed the primary level of education while 20.4% had attained secondary level of education and 8.4% had never been to school. This appears to be a fairly high level of literacy for a slum area.

6.1.5 Marital status

Most heads of households (98.1%) were married and only 1.5% were single. Only 0.2% reported that they were divorced and the same proportion were separated.

6.1.6 Age and sex distribution

The male : female ratio for the entire population was 1:1. Those under five years of age constituted 35.1% of the total population while those under fifteen years constituted 53.9%. Those between 45-64 years of age only constituted 1.3% while those between 65 to 70 years were 4%. The dependency ratio was *1:4.

*Footnote: Dependency ratio indicates the number of dependent persons per each independent person.

$$\text{Dep. ratio} = \frac{\text{Total no. of persons } <15 \text{ years} + >65 \text{ years of age}}{\text{Total no. of persons between 15-65 years in the same population.}}$$

It was possible to establish the ages of only 87.1% of the heads of households. The ages ranged from 21 to 70 years with an average of 32 years. The majority (76.6%) were in the age category 25 to 44 years, 4.6% were between 21 to 24 years, 4.9% were between 45 to 64 years and 13.9% between 65 to 70 years.

The age of mothers ranged from 16 to 48 years with a mean of 25 years. Most of them (65%) were in the age category 16 to 25 years while 37% were in the category 26 to 44 years. Only 0.8% were in the category 45 to 48 years.

6.1.6 *Socio-economic status of the heads of households and mothers*

It was possible to establish cash income for only 129 out of 411 (31.4%) of the households. Most of the respondents (mothers) did not know their husbands' income or were unwilling to disclose this information. The mean monthly Cash Income was Kshs. 1462. About one third (35.5%) of those whose income was established earned between Kshs. 501 to 1000, while 30.5% earned between Kshs. 1001 to 1500, 14% between Kshs. 1501 to 2000 and 12.0% between Kshs. 2001 to 5001. Only 2.2% reported an income of above Kshs. 5001 while 5.8% reported that they did not have any income. The mean monthly disposable

income for mothers was Kshs. 634. Income ranged from Kshs. 80 to 3000. As many as 38.7% of the mothers had no disposable income, while 31.9% had between Kshs. 80 to 500, 22.3% between Kshs. 501 to 1000 and 5.1% between Kshs. 1001 to 2000. Only 2% had a disposable income of more than Kshs. 2000.

6.2 GENERAL KNOWLEDGE ON DIARRHOEAL DISEASES.

6.2.1 *Symptoms of diarrhoea*

The majority of the mothers (98.7%) reported frequent watery stools as a symptom of DD and 29.1% stated that fever is a common sign. Almost half of the mothers (44.5%) reported general weakness as an accompanying sign while 23.4% indicated that vomiting often accompanies diarrhoea. These answers were often given as multiple responses (See table 6.1).

Table 6.1 *Mothers' Perceptions of the Symptoms of diarrhoea*

Symptoms	Distribution of mothers (n=398)	
	n	%
Frequent watery stools	(393)	98.7
General weakness	(177)	44.5
Fever	(116)	29.1
Vomiting	(93)	23.4

* Multiple responses, therefore do not total 100%

6.2.2 *Causes of diarrhoea*

Numerous causes of diarrhoea were mentioned, often as multiple responses. The responses were grouped as shown in table 6.2. Many mothers, 32.2% did not know the causes of diarrhoea and 22.4% attributed diarrhoea to teething. As many as 15.3% mothers, attributed it to unclean surroundings. Two dietary factors; introduction of new foods and eating of food which does not agree with the child, were stated as causes by 4.8% and 6.5% respectively. Factors related to superstition were mentioned by 6.5% of the mothers. The most commonly mentioned factors were; breast feeding the child while the mother is pregnant, one of the spouses being unfaithful to the other and the mother sharing the same bed with the child when she is pregnant.

6.2.3 *Perceived dangers of diarrhoea*

As shown in table 6.3, most of the mothers (74.9%) perceived diarrhoea as a potential cause of death, while 41.9% indicated that diarrhoea causes weakness in children. Only 31.9% knew of the dehydration consequences of DD.

Table 6.2 *Mothers' Perceptions of the Causes of diarrhoea*

Causes of diarrhoea	Distribution of mothers (n=398)	
	n	%
Environmental factors:		
Unclean surroundings	(61)	15.3
Poor hygiene:		
Eating contaminated foods	(18)	4.5
Dietary causes:		
Introduction of new foods	(19)	4.8
Eating of food which does not agree with child	(26)	6.5
Milestones:		
Due to teething	(89)	22.4
Child started crawling/walking	(16)	4.0
Change of climate	(12)	3.0
Superstition	(26)	6.5
Due to illness	(30)	7.5
Eating of soil	(37)	9.3
Do not know	(128)	32.2

* Multiple responses therefore the responses do not total 100%

Table 6.3 *Mothers' perceptions of the dangers of diarrhoea*

Danger	Distribution of mothers (n=398)	
	n	%
Death	(298)	74.9
Dehydration	(127)	31.9
Loss of appetite	(77)	19.4
Weakness	(167)	41.9

* Multiple responses

6.2.4 Recognition of the signs of dehydration

In determining whether mothers could recognize the indicators of dehydration, the eight signs recommended by WHO were used (WHO, 1981a) as shown in table 6.4. Mothers were asked to describe a child who has severe diarrhoea, or who has suffered from diarrhoea for a long time. There was a lot of probing in order to establish that the mothers understood the question, so as to elicit the responses quoted in table 6.4.

Table 6.4 *Indicators of dehydration as recognized by mothers*

Signs of dehydration	Distribution of Mothers (n=410)	
	n	%
General weakness	(345)	84.1
Sunken tearless eyes	(260)	63.4
Sudden weight loss	(218)	53.2
Inelastic (loose) skin	(50)	12.2
Little amount of urine	(25)	6.1
Increased thirst	(23)	5.6
Sunken fontanelle	(17)	4.1
Dry mouth and tongue	(12)	2.9

• Multiple responses, therefore do not total 100%

As shown in table 6.4, the most commonly reported sign of dehydration was general weakness, sunken and tearless eyes while 53.2% also recognized the

nutritional implications of diarrhoea or knew that a child may lose weight suddenly. All the responses fitted into the WHO recommended signs. However, general weakness which was mentioned by the majority of the mothers does not in isolation indicate dehydration. Slightly less than half (48%) of the mothers knew of two signs of dehydration only.

6.3 MOTHERS' KNOWLEDGE, ATTITUDES AND PRACTICES IN THE USE OF ORS

6.3.1 *Awareness and use of oral rehydration therapy*

Awareness of oral rehydration therapy in the study area was quite high as 63.0% of the mothers had heard of both prepackaged ORS and SSS. About a third (32.4%) had heard of only SSS while 3.4% had heard of only prepackaged ORS. Only 1.2% (5 out of 411) mothers had heard of neither forms of ORS. Almost three quarters of the mothers (70.1%) had used SSS only as compared to 16.5% of the mothers who had used prepackaged ORS only. Only 8% had used both types of ORS as indicated in table 6.5.

Table 6.5 Awareness and use of oral rehydration therapy.

	(n=411)			
	Awareness		Used in Past	
	n	%	n	%
Prepackaged ORS only	(14)	3.4	(68)	16.5
SSS only	(133)	32.4	(288)	70.1
SSS and prepackaged ORS	(259)	63.0	(33)	8.0
None of them	(5)	1.2	(22)	5.4

The majority of mothers, 96.8% were identified as CURRENT USERS of ORS, while only 3.2% were categorized as NO LONGER USING ORS (see definition p.xvii). Of the mothers who had heard of prepackaged ORS, 12.4% of them had never used it compared to 7.3% who had heard of SSS but had never used it.

6.3.2 Utilization of ORS for the most recent diarrhoea episode.

Of those mothers who used ORS for the most recent DD episode in the index child, 20.0% used prepackaged ORS compared to 58.6% who used SSS and 21.4% who used both types of ORS (see figure 6.1). Of those mothers (345) who used ORS to treat the most recent diarrhoea episode, 65.4% of them used only ORS while 34.6% had also used other modes of treatment. Of those mothers who had used other modes of treatment, 73.5% reported that ORS alone is not effective in treating diarrhoea while 18.9% of them reported that they used ORS simply because they were given the

sachets at a health facility. As shown in table 6.6, the majority of mothers (81.8%) who had used other modes of treatment together with ORS used drugs only, either from a health facility or from shops, whereas 12.9% used herbs only and 5.3% used both drugs and herbs. It appears that the use of ORS is concurrent with traditional methods of diarrhoea management. However, it should be noted that in the absence of information on whether the children who suffered from diarrhoea also experienced other illnesses at the same time, this finding should be interpreted with caution. It can only be interpreted as a proxy indicator of mothers confidence in the efficacy of ORS.

Distribution of users by ORS type

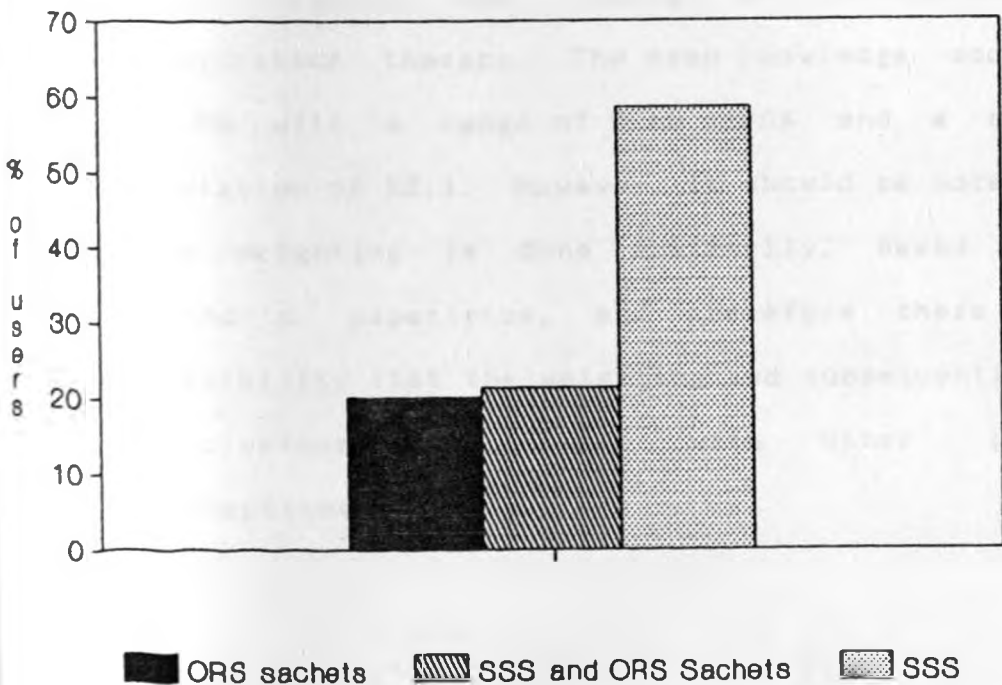


Table 6.6 *ORS and Concurrent treatment used in management of the most recent diarrhoea episode in the Index child.*

Treatment Used in combination with ORS	Distribution of mothers (n=132)	
	n	%
Drugs only	(108)	81.8
Herbs only	(17)	12.9
Drugs and herbs	(7)	5.3

6.3.3 *Mothers' computed knowledge score on ORT*

Mothers' knowledge on ORS was determined using a computed knowledge score (as illustrated in appendix 3 p.165), based on their responses to various questions such as ORS awareness, preparation of the rehydration solutions, frequency of ORS administration and timing of initiation of rehydration therapy. The mean knowledge score was 43.6% with a range of 0 to 100% and a standard deviation of 22.1. However, it should be noted that the weighting is done arbitrarily, based on the author's experience, and therefore there is a possibility that the weighting and subsequently final conclusions may change with other people's perceptions.

6.3.4 *Understanding of the role of Oral rehydration therapy*

Mother's understanding of the role of ORT was determined on the basis of her responses in relation to the description of the efficacy of oral rehydration solutions. A "maternal cognitive model of ORT effect" was thus developed based on these responses. The responses were grouped into two categories as follows:

1) Hydration theory model- those who believe that ORT replaces lost fluids from the body and does not stop diarrhoea.

2) Curative theory model- those who think that ORT will cure or stop diarrhoea.

Hydration theory model

Respondents who reported the function of ORS as "replacement of body fluid" or "prevention of water loss from the body", either singly or together with "prevents weakness", seemed to correctly understand the function of ORS and were thus classified under "hydration theory model". Of the mothers (382) who believed that ORT was helpful, 24.2% belonged to this group.

Curative theory model

Respondents who described the function of ORS as "stops or reduces diarrhoea" either singly or together with "prevents weakness" subscribed to the "curative theory model". Those who gave a combination of "replacement of body fluids" and "stops diarrhoea" as a response also subscribed to this model as they did not understand clearly the function of ORS in terms of rehydration. Only 1.3% (5 out of 382) mothers gave this response.

Of the mothers (382) who believed that ORT was helpful, 75.8% subscribed to the curative theory model. The most frequently mentioned function of ORS by these mothers was "stops diarrhoea" by 57.0%, "prevents weakness" by 17.1% and "reduces diarrhoea" by 15.4%. These answers were often given as multiple responses. Based on her work in rural north India, Bentley (1988), distinguished three categories of "maternal cognitive model of ORT effect". In addition to the two categories cited above, she categorized those respondents who believed that ORT has the dual function of "water replacement and cure" as subscribing to "hydration and curative theory model". In this study, this was not attempted because of the small sample size (only 5 out of 382 mothers).

6.3.5 Preparation of Oral rehydration solutions

Slightly over half (58.3%) of the mothers could recall the correct recipe for preparing rehydration solutions from prepackaged ORS. Almost half (46.7%) of the mothers did not know how to prepare the solution correctly. Of these mothers, 64.4% quoted salts in amounts that would lead to hypertonic solutions, while 35.6% quoted amounts of salt that would lead to hypotonic solutions (See table 6.7).

Less than one third (27.5%) knew the correct recipe for preparing SSS while 72.5% did not know the correct recipe. Of those who did not know the correct recipe, 77.2% of them quoted high amounts of salt (See table 6.7). In general a higher proportion of mothers found it easier to recall the recipe for making prepackaged ORS as compared to the preparation of SSS.

Table 6.7 *Concentration of incorrectly made ORS as recited by mothers*

Concentration of Incorrectly made solutions	Distribution of mothers			
	Prepackaged ORS		SSS	
	(n=90)		(n=263)	
	n	%	n	%
High concentration of sodium	(58)	64.4	(203)	77.2
Low concentration of sodium	(32)	35.5	(60)	22.8

6.3.6 *Timing of initiation of rehydration therapy*

About two thirds (65.8%) of the mothers reported that they started administering ORS on the first day of diarrhoea episode. As many mothers as 13.7% waited until the second day to initiate rehydration therapy while 12.9% started on the third day of episode. The remaining mothers (7.7%) waited for at least four days before starting the therapy (see table 6.8). On the average, the late starters (34.2%) initiated rehydration therapy two days after the onset of diarrhoea.

Of the mothers who initiated the therapy on the first day of illness, 26.4% of them reported that they did so in order to prevent dehydration while 66.8% reported that they wanted to prevent the diarrhoea from getting worse. About 42% of the mothers who did not start administering ORS on the first day of episode, delayed while awaiting to ensure that the diarrhoea was "real" while 41.5% wanted to determine the severity of the episode.

Table 6.6 *Distribution of mothers by timing of initiation of oral rehydration therapy.*

Initiation of ORT (by day of episode)	Distribution of mothers (n=380)	
	n	%
First day	(250)	65.8
Second day	(52)	13.7
Third day	(49)	12.9
Fourth day	(17)	4.5
Fifth- seventh day	(12)	3.1

The majority of the mothers, (79.9%) stop rehydration therapy on the day diarrhoea stops while 12.0% stop a day after diarrhoea ceases. The remaining mothers (8.1%) stop the therapy during illness, if there is no improvement.

6.3.7 Frequency of administration of ORS

About a third (29.7%) of the mothers administered ORS to their children three times every twenty four hours. Another third (30.2%) reported that they administered ORS every time the child was thirsty, 16.0% indicated that they gave the solution every time the child vomited, while 17.1% gave the solution four times per day. The remaining mothers (7%) administered the solution either once or twice a day. WHO (1989), recommends an intake of ORS after each loose stool. However, in this phase of the study, frequency of ORS administration was not related to

the number of stools passed as the frequency of stool output was not determined in the first phase of the study (see p. 63).

Most of the mothers (74.3%) reported that their children like the taste of ORS. All the mothers whose children do not like the taste of ORS, stated that they forced their children to take it.

6.3.8 Volume of ORS administered per day

The volume of ORS administered every twenty four hours ranged from 5 mls to 1380 mls with a mean amount of 391 mls. As many as 19.5% of the mothers administered ORS in amounts as little as between 5 mls to 100mls per day. Over one third of the mothers (39.6%) administered half a cup or glass of ORS, while as many as 17.5% mothers gave one to two teaspoons of ORS at each time of administration. The remaining mothers quoted amounts varying between one tablespoon to one quarter cup, with some indicating that they gave as much of the solution as the child could take. The WHO (1989) recommends an intake of 50-100mls ($1/4$ - $1/2$ large cup) after each loose stool for children under 2 years of age and double this amount for older children. Figure 6.2 (p. 85) shows that age had no bearing on the amount of ORS administered. However, caution should be taken in interpreting this data because the amount of ORS

administered also depends on the severity of the DD episode. In this phase of the study, the amount of ORS administered was not related to severity of DD episode (see p. 63) and thus this information can only be used as a proxy indicator of what mothers' practices with respect to amount of ORS given, are in the study area.

Volume of ORS administered by age of child

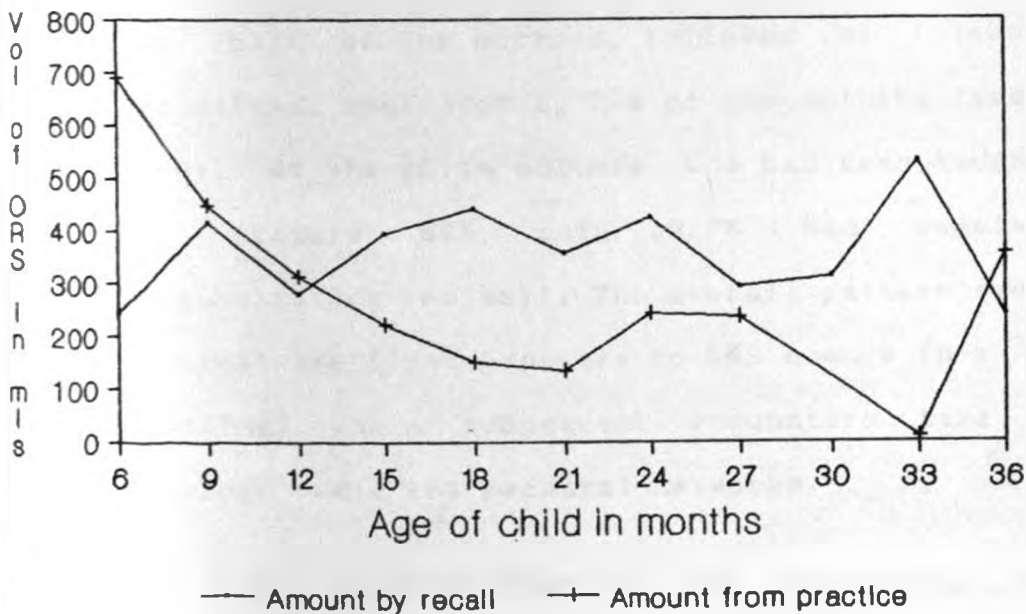


Figure 6.2

6.3.9 Source of information on ORS

The most commonly mentioned first source of information on pre-packaged ORS was a health facility, mentioned by 69.5% of the mothers, followed

by Mass Media (radio mainly) mentioned by 24% of the mothers (see table 6.9). The majority of the mothers, 83.4% had been taught how to prepare the solution, most of them at a health facility. Only 20.3% of those mothers who had received some teaching on how to prepare the solution had received a demonstration as well. The majority, 89% of those who had received a demonstration did so at a health facility.

The most frequently mentioned first source of information on SSS was a health facility, mentioned by 75.7% of the mothers, followed by friends and relatives, mentioned by 20% of the mothers (see table 6.9). Of the 95.1% mothers who had been taught how to prepare SSS, only 38.7% had received a demonstration as well. The overall pattern seems to be that the first exposure to ORS occurs in a clinic setting, while subsequent encounters take place through radio and personal networks.

It also appears that in the instruction on the preparation of ORS, demonstrations take place in less than 40% of the cases, for both prepackaged as well as home made SSS.

Table 6.9 *First Source of Information on ORS*

Type of ORS	Source of Information					
	Health facility		Mass media		Friends/Relatives	
	n	%	n	%	n	%
Prepackaged ORS: (n=272)	(189)	69.5	(65)	23.9	(18)	6.6
SSS: (n=391)	(296)	75.7	(78)	20.0	(17)	4.3

6.3.10 *Source and availability of ORS sachets*

Of the mothers who were aware of Prepackaged ORS, 53.6% knew that they can obtain the sachets from a health facility, 15.2% from shops and 27.4% knew they can be obtained from both sources while 3.8% did not know where they can be obtained. The cost of ORS sachets quoted, ranged from Kshs. 1.00 to Kshs. 2.50, with the most frequently mentioned being Kshs. 1.50. Over half, (57.3%) of the mothers indicated that ORS sachets were not expensive. Most of the mothers (64.5%) reported that ORS sachets were easily available in the locality while 20% reported that they were not. The remaining mothers (15.5%), did not know whether the ORS sachets were easily available in the locality or not. It appears that the majority of the mothers associate availability of ORS sachets with health facilities and only a smaller proportion are aware of their availability in the shops.

6.4 MOTHERS' ATTITUDES TOWARDS ORS.

6.4.1 *Perceived effectiveness of ORS.*

The majority of the mothers 95.3%, considered ORS as an effective treatment for diarrhoea. When mothers were asked to comment on the effectiveness of ORS in the last diarrhoea episode the majority (91.3%) reported that the child's condition improved. (see table 6.10).

Table 6.10 *Mothers' Perceived effect of prepackaged ORS and SSS*

Perceived Effect	Distribution of mothers (n=380)	
	n	%
Improved	(347)	91.3
Stayed the same	(25)	6.6
Became worse	(8)	2.1

The results presented in table 6.10 are based on the most recent dd episode suffered by the index child.

6.4.2 *Preference of pre-packaged ORS versus the home-made SSS.*

Of the mothers who had used both prepackaged ORS and SSS, 50.7% preferred prepackaged ORS, while 23% preferred SSS. About a quarter, (26.3%) reported that both types of ORS were the same.

The majority of the mothers, (92.4%) who preferred pre-packaged ORS, did so because they thought that it

was more effective than SSS. Only 3.7% reported that they preferred the prepackaged ORS because they found it easier to prepare.

Most of the mothers, (62.5%) who preferred SSS do so because they think that it is more effective than the prepackaged ORS, while 16.7% preferred it because the ingredients for preparing it were easily available.

6.5 DETERMINANTS OF ORS KNOWLEDGE AND UTILIZATION.

Simple or zero-order bivariate correlations were performed among the independent variables and each dependent (outcome) measure of ORT knowledge and use. A series of stepwise discriminant analyses were performed for each dependent variable and those independent variables which had statistical significance in the correlations analyses in order to determine which of these variables would predict with highest precision, ORS utilization. (The results of the correlations are presented on table 6.15 p. 97)

6.5.1 *Knowledge on Oral rehydration therapy*

The weighted knowledge score was correlated with mothers' educational level and age. Only age of the mother was significantly associated with knowledge on ORT ($P < 0.001$). Older mothers tended to be more

knowledgeable about ORT than younger mothers.

6.5.2 *Use of SSS in the past.*

Correlations between use of SSS in the past yielded significant associations with educational level and computed knowledge on ORT of the mother. Other variables which did not yield any statistically significant associations were; mothers' understanding of ORT and disposable income as well as her age and that of the child. Mothers of lower educational levels and those who were more knowledgeable were more likely to have used SSS in the past ($P < 0.01$ and $P < 0.001$ respectively).

When a stepwise discriminant analysis was carried out in order to determine which of these factors had a stronger influence on use of SSS, mothers' knowledge on ORT had a stronger influence. Tables 6.11 and 6.12 summarize the results of this analysis. Stepwise introduction of these variables correctly classified 73.1% of non-users of SSS and 79.2% users of SSS. The overall percentage of cases correctly classified was 78.8%.

Table 6.11 Summary results of the discriminant analysis on past use of SSS (n=337)

Independent variables	wilk's Lambda	Significance (P value)
Knowledge on URT	.90399	0.00
Education of mother	.88048	0.00

Table 6.12 Classification results of discriminant analysis on past use of SSS

Actual group	Cases	Predicted group membership			
		Non-users of SSS		Users of SSS	
		n	%	n	%
Non-users of SSS	26	19	73.1	7	26.9
Users	361	75	20.8	286	79.2
Ungrouped cases	24	15	62.5	9	37.5
Percentage of cases correctly classified= 78.0%					

Discriminant analysis equation:

Use of SSS= .615 -.425 knowledge on URT -1.025 educational level of the mother.

6.5.3 Use of prepackaged URS in the past.

There was no significant association between use of prepackaged URS and mother's age, educational level, understanding of URT, disposable income and child's age. However, there was a statistically significant

association between use of prepackaged ORS and mothers' computed knowledge on ORT, whereby mothers with higher scores were more likely to have used prepackaged ORS in the past ($P < 0.001$).

6.5.4 *Frequency of ORS administration*

There was a statistically significant association between frequency of ORS administration and mothers' age ($P < 0.01$). Age of child, educational level of the mother and understanding of oral rehydration therapy were not statistically associated to frequency of ORS administration. This finding disapproves the hypothesis that frequency of ORS administration is dependent on mothers' educational level. Although it had been the intention of the author to treat severity of diarrhoea episode in terms of the number of stools passed per day, as an independent variable, this did not materialize due to recall bias on the part of the respondents. Most mothers could not remember the number of stools that their children had passed any particular day, and, therefore, this information was considered unreliable and hence not used in the analysis.

6.5.5 *Understanding of the role of oral rehydration therapy.*

Mothers' levels of education and age were considered as independent variables. Only the level of education

had any association with understanding of the role of oral rehydration therapy, when correlation analysis was carried out. Mothers with higher educational levels tended to understand ORT better than those with lower levels of education ($P < 0.01$). This proves the hypothesis that the level of maternal education influences mothers' understanding of the role of oral rehydration therapy.

6.5.6 *Timing of initiation of oral rehydration therapy.*

Mother's age, her educational level, age of child and the mother's understanding of oral rehydration therapy were considered as independent variables. The only variables that yielded a significant association with timing of the initiation of oral rehydration therapy was mother's educational level and understanding of oral rehydration therapy. Mothers of higher educational levels and those who understood the role of oral rehydration therapy or those who subscribed to the "hydration theory model" were more likely to initiate the therapy on the first day of a diarrhoea episode (both variables $P < 0.001$). Those who subscribed to the "curative theory model" were more likely to delay rehydration therapy. This finding proves the hypothesis that timing of initiation of rehydration therapy is influenced by mother's

educational level. When a stepwise discriminant analysis was carried out to determine which of these factors had a stronger influence on the timing of initiation or rehydration therapy, both the variables entered the model, but educational level had a greater influence than understanding of the role of ORT. Tables 6.13 and 6.14 summarize the results of this analysis. Stepwise introduction of these variables correctly classified 52.0% of the late initiators of ORT and 70.5% of those who initiated ORT at the right time. The overall percentage of cases correctly classified was 64.6%.

Table 6.13 *Summary results of the discriminant analysis on timing of initiation of ORT*

Independent variables	Wilk's Lambda	Significance (F values)
Education level	.97846	0.00
ORT model	.96224	0.00

Table 6.14 *Classification results of discriminant analysis on timing of initiation of ORT*

Actual group	Cases	Predicted group membership			
		Incorrect timing of initiation of ORT		Correct timing of initiation of ORT	
		n	%	n	%
Incorrect timing of initiation of ORT	102	53	52.0	49	48.0
Correct timing of initiation of ORT	217	64	29.5	153	70.5
Ungrouped cases	3	1	33.3	2	66.7

Percentage of cases correctly classified= 64.6%

Discriminant analysis equation:

$$\text{Initiation of ORT} = 1.952 - 1.302 \text{ Knowledge on ORT} + .266 \text{ education level.}$$

6.5.7 *Volume of ORS administered per day.*

Age of child, age and educational level of the mother as well as mother's understanding of oral rehydration therapy were taken as independent variables. Educational level of the mother and age of child had no bearing on the amount of ORS administered (See figure 6.2 p. 90 and figure 6.3 p. 102). The only variable that yielded a significant association with volume of ORS administered per day was mother's understanding of ORT. Mothers who understood ORT were more likely to administer ORS in greater amounts (P<0.01).

6.5.8 Preparation of SSS and prepackaged ORS.

Mother's level of education and age were correlated with the method of preparation of SSS and prepackaged ORS but none had any significant association with either of the two methods of ORS preparation.

6.5.9 Preference of prepackaged ORS versus SSS.

Mother's age, educational level and disposable income, and age of child yielded no significant associations with preference of ORS type.

In summary, mothers' knowledge on ORT, understanding of the role of ORT, educational level and age were associated with both past and correct use of ORS.

Volume of ORS administered by educational level of the mother

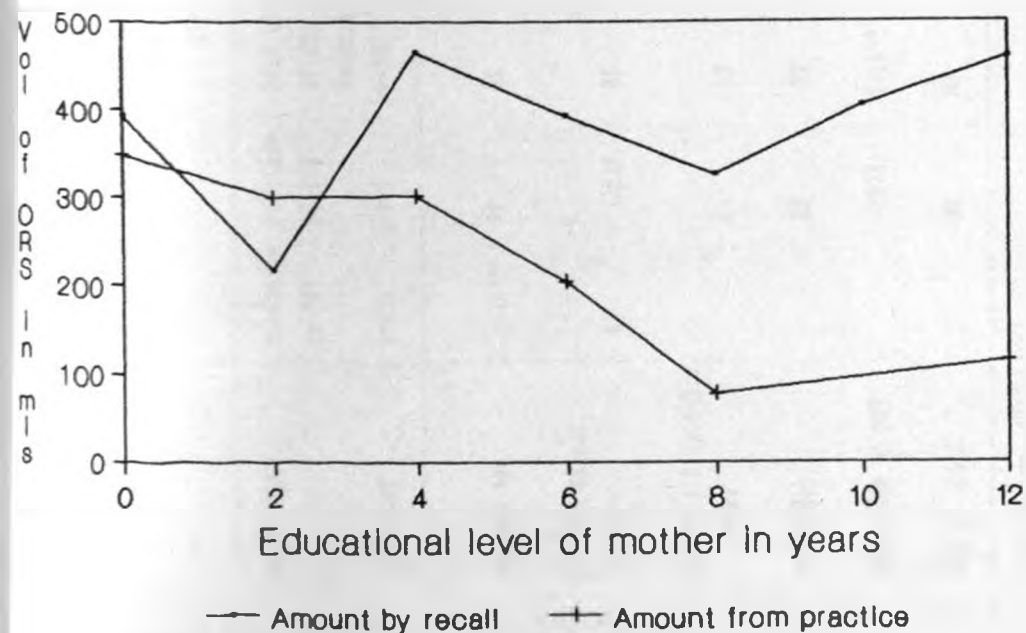


Table 6.15

CORRELATIONS BETWEEN INDEPENDENT & DEPENDENT VARIABLES
ON ORT KNOWLEDGE AND UTILIZATION

DEPENDENT VARIABLES

INDEPENDENT VARIABLES	Knowledge on ORT n=411	Past use of SSS n=387	Past use of ORS Packets n=261	Frequency of ORS Administration n=374	Understanding of ORT n=322	Timing of Initiation of ORT n=319	Volume of ORS Administered n=319	Preparation of ORS packets n=216	Preparation of SSS n=363	Preference of method of ORT n=154
Mothers Age	.2114**	NS	NS	.1338**	NS	NS	NS	NS	NS	NS
Mothers Educat. level	NS	-.1361*	NS	NS	.1350*	.1943**	NS	NS	NS	NS
Mother's Disposable Income		NS	NS							NS
ORT Model		NS	NS	NS		.1467**	.1505*			
Knowledge on ORT		.3976**	.4716**							
Age of child		NS	NS	NS		NS	NS			NS

NS= Not Significant.

**= $p < 0.001$

* = $p < 0.01$

+ = $p < 0.05$

SECTION TWO (PHASE TWO)

Observation of diarrhoea episodes

Sixty cases of diarrhoea were observed for two days each, leading to 120 observation days. Observation started on either the second or third day of the episode.

6.6.1 *First Action taken on onset of diarrhoea.*

Out of 60 mothers, the majority (70%) administered ORS as the first action against the diarrhoea (13% gave prepackaged ORS and 57% gave SSS). A small proportion of the mothers (10%) gave medicine from the shops and a similar proportion took their children to a health facility. Only 5% increased fluid intake, while only 1.7% (one mother out of 60) stopped giving all foods. Only 2 mothers out of 60, (3.3%) took no action against the diarrhoea during the observation (see table 6.16).

The mothers who did not use ORS gave varied reasons for not doing so; 17.6% of them reported that they did not use it because the diarrhoea episode was not severe, while a similar proportion did not use it because it was not suitable for the type of diarrhoea. Another 17.6% of the mothers did not use it because it was not effective from past experience. Other reasons given included "child

vomits after taking it", "child does not like the taste", "child is too old" and "still giving other treatment".

Table 6.16 *Mothers' first action in the management of a diarrhoea episode*

First action taken	Distribution of mothers (n=60)	
	n	%
Administered SSS	(34)	57.0
Administered prepackaged ORS	(8)	13.0
Gave medicine from the shops	(6)	10.0
Took child to a health facility	(6)	10.0
Increased fluid intake (not ORS)	(3)	5.0
No action taken (during the observation period)	(2)	3.3
Stopped giving all foods	(1)	1.7

6.6.2 *Timing of initiation of rehydration therapy.*

Most of the mothers (70%) who gave ORS started rehydration therapy on the first day of episode where as 22.7% started a day after the onset of diarrhoea. Only 2.3% started rehydration therapy after three days of diarrhoea.

6.6.3 *Diarrhoea severity and ORS Utilization*

Diarrhoea was characterized as mild, moderately severe and severe on the basis of the number of

stools passed per day and whether they were watery or not. Three to four watery stools per day was considered mild, five to six watery stools moderately severe and seven to nine watery stools as severe diarrhoea. There were statistically significant differences in the severity of diarrhoea by day of observation ($P < 0.001$). There were more cases of severe diarrhoea on day one of observation (day 2 or 3 of episode) as compared to day two of observation (day 3 or 4 of episode).

On the whole, 14.1% of the episodes were severe, 26.7% were mild and 59.2% were moderately severe.

On day one of observation, 16.7% of the episodes were categorized as mild, 66.7% as moderately severe and 16.7% as severe. Mothers used ORS for all the severe cases of diarrhoea. As many as 70% of the mild cases were treated with ORS while 67.5% of the moderately severe cases were treated with ORS (see table 6.17). The proportion of mothers who used ORS on day one of observation was 73.3% of which 88.6% administered SSS, 9.1% administered prepackaged ORS while 2.3 % gave both types of ORS.

On day two of observation, 36.6% of the episodes were categorized as mild, 51.7% as moderately severe and 11.7% as severe. The general picture was that the diarrhoea episodes were improving on this day of

observation.

ORS was administered in 6 out of 7 cases of severe diarrhoea and 67.7% cases of moderately severe cases (see table 6.17).

The proportion of mothers who used ORS on the second day of observation was 68.8% of which 4.9% used prepackaged ORS while 92.7% used SSS and 2.4% used both types of ORS.

Table 6.17 Mothers, utilization of ORS by severity of diarrhoea episode.

Severity of diarrhoea by day of observation	Use of ORS (n=43)			
	Used		Did not use	
	n	%	n	%
<u>Mild:</u>				
Day one of observation (n=10)	(7)	70.0	(3)	30.0
Day two of observation (n=22)	(14)	63.6	(8)	34.4
<u>Moderate:</u>				
Day one of observation (n=40)	(27)	67.5	(13)	32.5
Day two of observation (n=31)	(21)	67.7	(10)	32.3
<u>Severe:</u>				
Day one of observation (n=10)	(0)	100.0	(0)	0.0
Day two of observation (n=7)	(6)	85.1	(1)	14.9

6.6.4 Volume of ORS administered per day

The volume of ORS administered on day one and two of observation is shown on table 6.18. As a whole, mothers tended to give more ORS on day one of observation (day 2 or 3 of diarrhoea) when compared to day two of observation (day 3 or 4 of diarrhoea). However, mothers seemed to give more of the solution at each time of administration.

Table 6.18 Volume of ORS administered per day and at each time of administration (n=43)

Amount of ORS given	Day of observation (amount of ORS in mls)			
	Day 1		Day 2	
	mean	range	mean	range
Volume of ORS given per day:	234	10-1200	208	10-800
Amount of ORS given at each time of administration:	76	5-270	85	5-300

6.6.5 Frequency of administration of ORS

On day two or three of DD illness, 34.9% of the mothers administered ORS either once or twice, the same proportion administered it three times while 30.2% administered it either four or five times. The mean number of times that ORS was administered was 2.9 with a range of 1 to 5 times per day. On the

third or fourth day of DD illness, 45% of the mothers administered ORS either once or twice, 30% three times and 25% administered it either four or five times. The mean number of times that ORS was administered was 2.5, with a range of 1 to 5 times. The general picture was that mothers gave ORS less frequently on these days of DD illness as compared to day 2 or 3 of DD episode.

6.6.6 Sodium content of the oral rehydration solutions made by mothers

A laboratory analysis of the content of the solutions made by mothers is shown in table 6.19.

Table 6.19 Sodium content of rehydration solutions used during a diarrhoea episode (n=43)

Type of ORS				Distribution of Sodium Concentration of Samples (mmols/l)					
	mean	SD	range	<50 n	%	50-120 n	%	>120 n	%
<u>Pre-packaged:</u>									
day one (n=5)	71	49	20-143	(2)	40.0	(2)	40.0	(1)	20.0
day two (n=2)	71	12	62-80	(0)	0.0	(2)	100.0	(0)	0.0
<u>Salt sugar solution:</u>									
day one (n=37)	157	99	20-500	(2)	5.4	(13)	35.1	(22)	59.5
day two (n=36)	150	85	25-350	(1)	2.8	(14)	39.9	(21)	58.3

6.6.6.1 *Sodium content of pre-packaged ORS.*

As shown in table 6.19, the mean amount of sodium content in pre-packaged ORS prepared by mothers on day one of observation was 71 mmols/l, with a range of 20 to 143 mmols/l. Two mothers out of five prepared solutions containing sodium less than 50 mmols/l while only one mother prepared a solution containing 120 mmols/l.

On day two of observation, only two mothers administered pre-packaged ORS. The mean amount of sodium content in the prepared solutions was 71 mmols/l. No mother prepared a solution containing less than 50 mmols/l or more than 120 mmols. Only one out of five mothers therefore, prepared a hypertonic solution that could be dangerous to the child's health and two prepared hypotonic solutions that would not be very effective in preventing or treating dehydration.

6.6.6.2 *Sodium content of salt sugar solutions*

On day one of observation, the mean amount of sodium content in the SSS was 157 mmols/l. The amount ranged from 22 to 500 mmols/l with a standard deviation of 99. Only 5.4% of the mothers prepared a solution

containing sodium in amounts less than 50 mmols/l, 59.5% in amounts above 120 mmols/l. It can be seen on table 6.19 that only 35.1% of the mothers prepared safe and effective solutions while as many as 59.5% prepared solutions that could be dangerous to the child's health.

On day two of observation, the picture was not very different from that of the first day. The mean amount of sodium content of the solutions prepared was 150 mmols/l, with a range of 25 to 350 mmols/l and standard deviation of 85. It should be noted that some of the mothers used different recipes for preparing the solutions on the two days of observation.

6.6.7 *Storage of oral rehydration solutions*

On the whole, 51.4% of the mothers stored the prepared solutions well covered, 31.6% did not cover the solutions while the remaining mothers poured out the left over solutions. The mothers who did not cover the solutions exposed their children to a risk of further infection from the mixtures. Mothers who poured the left over solutions were not economical and also required more time for preparation of the solutions.

6.6.8 *Other types of treatment used together with ORS*

On day one of observation, 42.4% of the cases in which ORS was administered were also treated with drugs, either from the shops or health facilities, 8.5% cases were treated with herbs and the remaining 49.1% cases with ORS only. On day two of observation, drugs were used in 28.8% of the cases while in 6.8% of the cases, either herbs only or together with drugs were used. ORS only was used to treat the remaining 64.4% cases. It appears that use of traditional methods of diarrhoea management does not preclude use of ORS.

6.6.9 *Mothers' practices in the utilization of ORS (weighted score).*

Mothers' practices in the utilization of ORS were determined using a computed score. The computed practice score was determined by assigning a score to mothers' various practices in the use of ORS, as determined during the observation of their management of a diarrhoea episode. Such practices included preparation of the rehydration solutions, frequency of administration, timing of initiation of rehydration therapy and whether the mother used ORS or not. Appendix 4 page 166 shows the weighted score system used to determine mothers' practices in the

utilization of ORS. The mean practice score was 31.9% with a range from 0 to 71.9% and a standard deviation of 21.8. This is an indication that the mothers' practices in the use of ORS in this area are very poor. However, it should be noted that the weighting was done arbitrarily, based on the author's previous experience, and therefore the weighting and subsequently final conclusions may change with other people's perceptions.

6.7 DETERMINANTS OF ORS UTILIZATION

6.7.1 *Use of ORS*

The independent variables considered were severity of the diarrhoea episode (as already defined), age of child, presence of concurrent illness, educational level and age of the mother, mother's understanding of oral rehydration therapy, disposable income as well as her computed knowledge on ORT. When these variables were correlated with use of ORS, only severity of diarrhoea episode, educational level and computed knowledge score of the mother yielded significant associations. (Results of the correlation analysis is presented in Appendix 5 p. 167). Mothers were more likely to use ORS for severe cases of diarrhoea. Mothers with higher educational levels as well as those who were more knowledgeable on ORT were

more likely to use ORS ($P < 0.05$, $P < 0.05$ and $P = 0.00$ respectively).

When discriminant analysis was performed on these variables, knowledge on ORT was shown to be the strongest predictor of ORS use, followed by severity of DD episode and lastly mother's educational level. Tables 6.20 and 6.21 summarize the results of this analysis. Stepwise introduction of these variables correctly classified 100% of all users and non-users of ORS.

Table 6.20 *Summary results of the discriminant analysis on use of ORT*

Independent variables	Wilk's Lambda	Significance (P values)
Knowledge on ORT	.13846	0.00
Severity of DD episode	.12477	0.00
Education of mother	.11934	0.00

Table 6.21 *Classification Results of discriminant analysis on use of ORT*

Actual group	Cases	Predicted group membership			
		Non-users of ORS		Users of ORS	
		n	%	n	%
Non-users of ORS	16	16	100.0	0	0.0
Users of ORS	42	0	0.0	42	100.0

Percentage of cases correctly classified=100%

Discriminant analysis Equation:

Use of ORS = $5.877 + .856 \text{ education of mother} + .125 \text{ Knowledge on ORT} + 1.016 \text{ severity of DD episode.}$

6.7.2 Correct use of ORS

When Frequency of ORS administration, volume of ORS administered, timing of initiation of ORT and preparation of ORS were treated as Dependent variables, none of the Independent variables (age of child, severity of DD episode, educational level and age of the mother, mother's understanding and knowledge of ORT) yielded significant associations with them.

6.7.3 Mothers' practices in the use of ORS

When mothers' weighted practice score was treated as a dependent variable and maternal age and level of education as independent variables, none of them yielded any significant associations. This is an indication that none of these variables had an influence on mothers' practices in the utilization of ORS.

In summary, it can be said that despite the fact that all the mothers under observation had reported that they intend to continue using ORS to treat their

children in the future, over 20% of them did not do so during the observation period for various reasons. Mothers who were more knowledgeable on ORT were more likely to use ORS, although they did not necessarily use it correctly. It should be noted that the sample size (60) may have been too small to show other associations.

6.8 CASE STUDIES

As a whole, the case studies indicated that mothers preferred methods of DD management which stop the episode. Cultural beliefs were an important factor influencing the use of ORT. DD due to teething and witchcraft were believed not to be responsive to ORT. ORT was also believed to induce vomiting and this led to the withdrawal of the therapy. Drugs were viewed as an essential component of DD management with or without the use of ORT. (Detailed case studies are presented in appendix 6 p. 168).

CHAPTER SEVEN

DISCUSSION

7.1 MATERNAL KNOWLEDGE ON DIARRHOEAL DISEASES.

A large proportion of the respondents (about one third) did not know the causes of diarrhoea. Over a quarter (27%) of the respondents knew the right causes of diarrhoea. As many as 22.4% of the mothers still believed that teething causes diarrhoea. Diarrhoea during teething is common because at this time the gums are itchy and there is a tendency for children to pick up any item and rub them on the gum. Some of these items may not be clean and often lead to infection. Only a small proportion of the mothers (6.5%) believed in superstitious causes of DD. This could be explained by the fact that those who do not understand the causation of DD (usually those of lower educational levels) are likely to believe that it is caused by factors related to superstition. Formal education imparts knowledge essential to understanding the physical and biological characteristics of DD (Eisemon et. al., 1987).

Diarrhoea was perceived by the respondents as a very dangerous disease; the majority of the respondents perceived death as a possible consequence of

diarrhoea, while about half of them reported that it weakens children, although only a third of the mothers indicated that diarrhoea can cause dehydration.

Mothers' ability to recognize signs of dehydration was low. About one third of them reported that a child's eyes may become sunken while slightly over half of them recognized its nutritional implications. Other signs of dehydration, such as a sunken fontanelle and loss of skin elasticity were recognized by very few mothers. About half (48%) were unable to recognize more than two signs of dehydration. General weakness, as a sign of dehydration was recognized by most mothers, but this sign when considered in isolation does not indicate dehydration.

On the whole, mothers were not knowledgeable on DD. This is a discouraging finding in an area where there are a number of health facilities, and where health education intervention is expected to be an integral part of the health services offered.

7.2 MOTHERS KNOWLEDGE , ATTITUDES AND PRACTICES IN THE USE OF ORT.

7.2.1 *Maternal Knowledge and utilization of ORT.*

Maternal knowledge on ORT was low. Only 62.5% of

the mothers scored more than 50% in the computed knowledge score. This may be an indication of low quality of health education intervention. Mothers' age was positively related to knowledge on URT, while educational level was not. This contradicts study findings in Bangladesh, [Green, 1986], Kenya [Ndiku and Mandevu, 1987] and in Haiti [Coreil and Genece, 1988] in which mothers' educational level was positively related to URT knowledge. In this study, it is likely that URT knowledge was not related to maternal educational level due to the high frequency with which mothers are exposed to messages on URT. Older mothers are likely to have more experience in the use of URT on the assumption that they have more children.

The majority of the mothers (75.8%) subscribed to the "curative theory model" and did not therefore understand the role of URT in the management of DD. Other studies have shown similar findings [Bentley, 1988: and Coreil and Genece, 1988]. This may be due to the fact that health messages on URT do not explain explicitly the function of URT and thus mothers naturally assume that any treatment given is to stop DD. Mother's understanding of the role of URT was positively related to her educational level. Mothers of higher educational level understood URT

better. This is in agreement with Bentley's findings in Rural North India (1988).

SSS awareness and usage rate compared to that of prepackaged ORS was very high, most likely due to the fact that it has been recommended as a treatment for DD for a longer time than prepackaged ORS (CDD Programme Officials, 1989). The use of SSS has been prohibited only recently in Kenya (May, 1988). Some of the health centres were still encouraging the use of SSS because of inavailability of ORS sachets, as was confirmed by the principal investigator through visits to some of the health centres. However, it should be noted that private clinics rarely mentioned the use of ORT for treatment of DD. The principal investigator, had the impression that these health practitioners wanted to win mothers' confidence by offering a treatment that would rapidly stop DD, as this was the wish of most mothers.

Despite the fact that the majority of the mothers were categorized as current users of ORS, from the recall data, the observation data did not corroborate this finding. Over 20% of the mothers identified as current users of ORS, did not use it during the observation phase of the study. A variety of reasons were given such as "diarrhoea episode not severe", "ORS not suitable for the type of DD" or "ORS not

effective from past experience". It should be noted that during the interview, these mothers did not specify circumstances under which they would not use ORS. This is an indication that studies which involve collection of reported data may not reflect the realities of a situation, and especially so when it involves human behaviour. During the interview, the responses may be affected by factors such as; not understanding the question and a deliberate attempt to give the "expected" responses. This kind of data therefore, should always be interpreted with caution.

Mothers with lower levels of education reported higher use of SSS. However, this was not validated by the observation data in which SSS usage rate was greater among mothers of higher educational levels. This discrepancy could be due to the fact that the observation data may be more accurate than reported data. Only 11.7% of the mothers used prepackaged ORS during observation. Probably more mothers would have used this type of ORS if the sachets were readily available and cheaper. Past use of prepackaged ORS was not significantly associated with maternal educational level, which may be a further indication that availability and cost of ORS sachets may be a major constraint to use of prepackaged ORS. It is possible, therefore that some mothers who wanted to

use could not afford or get ORS sachets.

Mothers who were more knowledgeable on ORT were more likely to be users of both SSS and prepackaged ORS. This finding was confirmed by the observation data. Even though during the interview and observation phases of the study, the role of socio-cultural factors as determinants of ORT use was not explored, the case studies indicated that cultural factors are very important in determining the management of a DD episode. Many mothers who believed that the DD was caused by teething or superstitious factors did not use ORS because it was believed not to be effective for these types of DD. (See appendix 6 case studies 2, 3, 4). The mothers' primary desire was to see the DD stop (even for those who understood the role of ORT) and thus ORS was not considered as an effective treatment without the use of drugs. This is a rational way of thinking because the loose stools are messy and cause discomfort to the child, and ORT is slow in eliminating them.

Among the episode characteristics studied, (presence of concurrent illness and severity) only severity of DD had a positive relationship with ORS use. Mothers tended to use ORS for the more severe episodes. This is an encouraging finding and shows that mothers are rational beings and are thus naturally more

concerned about the more serious episodes. However, about 70% of the mild cases of diarrhoea were also treated with ORS. This finding is not easy to explain. Probably mothers who treated mild cases of DD with ORS did so in order to prevent "DD from getting worse" as some of them had indicated during the first phase of the study. However, it should be noted that severity of DD also motivated them to use other means of treatment in addition to ORS.

Many mothers used ORS incorrectly, in terms of; preparation of the solution (77%), timing of initiation of the therapy (34%), frequency of ORS administration (70%) and volume of ORS administered (28%). The majority of the mothers (77% for those using SSS and 64% for those using prepackaged ORS) recited recipes that were likely to lead to hypertonic solutions. This finding was corroborated by the observation data and is in agreement with findings reported elsewhere [Erasmus et. al., 1981; Mull and Mull, 1988; Nwoye et. al., 1989 and Desai et. al., 1989]. The probability of mixing incorrectly composed solutions was greater with SSS than with prepackaged ORS as revealed in both phases of the study. Mothers appeared to have difficulties in measuring the ingredients for SSS correctly and thus there was a greater variability in the sodium content

of SSS than in the prepackaged ORS. This finding is in agreement with the findings of a study conducted in Kiambu District of Kenya (Desai et. al., 1989). The making of SSS involves more precise measurements as compared to prepackaged ORS, and thus the probability of being inaccurate is higher. It was also observed that some mothers used different methods to prepare the solutions on the two days of observation, indicating that the preparation of ORS is "a hit and miss affair" for some of the mothers.

Problems related to the preparation of ORS may be partly explained by several factors. Firstly, despite the fact that the majority of the mothers had been taught how to prepare ORS in a health facility, only 20.3% of them had received a demonstration on the preparation of the pre-packaged ORS and only 38.7% of them for SSS. This was confirmed by the author's observation of health education sessions in some of the health centres in the study area. The author witnessed demonstrations on the preparation of ORS in only one of the five clinics visited.

Another possible cause of confusion to the mothers, may be the varied methods of preparation of the solutions to which mothers are exposed in different settings. Different health institutions instruct mothers on different recipes (in terms of volume of

containers and amount of sugar salt) used for preparing SSS. This was witnessed by the author in some of the health centres in the study area. It should also be noted that there was a variation in the utensils available in the homes and this had implications on the methods for preparing ORS.

Lastly, there are various types and sizes of ORS packets, giving different preparation instructions. For example, in the study area ORS sachets were available to be dissolved in one litre, 500mls, 300mls, 250mls and 200mls of water. This can be a source of confusion to mothers especially those of lower levels of education. Most mothers are taught the preparation of ORS in a health facility where one litre packets are used and yet most of the packets available in the shops require less than one litre of water. During observation, one mother dissolved the contents of an ORS packet in one litre of water instead of 300mls.

Preparation method for both prepackaged ORS and SSS was not related to mothers' educational level and age. It would have been expected that mothers with higher educational levels and who are better able to comprehend the instructions on the packets, would be more likely to prepare prepackaged ORS correctly, as was found in a rural part of Kenya [Eisemon et.

al., 1987]. However, given that there are various sizes of ORS sachets on the market and the fact that instructions on some packets may not be clear, could have lead to confusion amongst the mothers (Eisemon et. al., 1987; Ndiku and Mandeavu, 1987).

in this study, mothers who started ORT on the first day of illness were considered as early initiators. Two thirds of the mothers initiated ORT on the first day of illness. This was true of both the data collected retrospectively and by observation. In Haiti, many mothers were also reported as late initiators of ORT [Coreil and Genece, 1988]. It is recommended that ORT is initiated as soon as DD starts (WHO, 1989). Timing of initiation of ORT was positively related to mothers' understanding of the role of ORT and her educational level. The strongest predictor of timing of initiation of ORT in this study was mothers' educational level. This finding is similar to Bentley's in rural North India (1988). Mothers who understand the role of ORT recognize the importance of initiating ORT early in order to prevent dehydration.

The recall and observation data revealed that most mothers administered ORS at a low frequency, and in amounts not sufficient to prevent dehydration or to rehydrate a child. During interview 36.7% mothers

reported that they administered ORS at most three times in 24 hours, while 58.5% administered less than 400mls of the solution in the same period of time. About 70% of the mothers observed, administered ORS between one and three times daily. WHO (1989) recommends that ORS is administered after each loose stool and since DD is defined as more than 3 watery stools per day, most mothers administered the solutions at a frequency lower than what is desirable. There was no association between the frequency of ORS administration and the number of stools passed, as indicated by the observation data. However, it should be noted that the intake of other fluids which also play a part in rehydration was not investigated. On the whole, mothers tended to give less of the solution from practice as compared to reported data, (see figure 6.2 p.85 and figure 6.3 p. 96) confirming that what is reported is not always a true reflection of behaviour.

Frequency of ORS administration was found to be positively related to mothers' age. This may be because older mothers presumably have more experience and are also likely to be more diligent in child care practices than younger mothers .

The volume of ORS administered per day was found to be positively associated with mothers' understanding

of the role of ORT. This is an expected finding because such mothers understand that the solution has to be given in appreciable amounts in order to replace the lost body fluids, and/or prevent dehydration. Age of child and educational level of the mother had no bearing on amount of ORS administered (see figure 6.2 p. 90 and figure 6.3 102).

7.2 Mothers attitudes towards ORT.

The attitudes towards ORS was very positive. Majority (91.3%) of the respondents reported that ORS improved the condition of their children. Such results have also been found elsewhere [Thane-Ioe et. al... 1984; Green, 1986; Corell and Genece, 1988]. This could be considered as an encouraging finding when taken in isolation, yet when viewed together with the perceived effectiveness of ORS, its importance is reduced. Most mothers, who view ORS as effective consider it so, because it stops or reduces diarrhoea. It could thus be assumed that subsequent use of ORS would be deterred if mothers expectations are not met. This was evidenced by the proportion of mothers, who had been identified as Current Users of ORS, and who did not use it during observation because, ORS was not useful from past experience. As many as 17.6% of the non-users gave this as a reason

for not using ORS.

About half of the mothers who had used both types of ORS, prefer the pre-packaged ORS. The majority of them (92.4%) do so because they consider it more effective. This is an encouraging finding in light of the fact that the Ministry of Health has prohibited the use of SSS. However, a discouraging finding is that the majority of the mothers who prefer SSS do so because they also think it is more effective. Mothers' educational level, age, disposable income and age of child were not related to preference of ORS.

In summary, the main maternal characteristics which seemed to have the greatest influence on both past and correct use of ORS were:

- 1) Knowledge on ORT
- 2) Educational level
- 3) Age
- 4) Understanding of the role ORT in the management of dd.

Among the DD episode characteristics considered, only severity had a positive association with ORS use.

Overall, the most important determinants of ORS knowledge, past and correct use were the characteristics of the decision-makers (mothers)

themselves rather than attributes of specific DD episodes. This finding is in agreement with what Coreil and Genece found in Haiti (1988).

CHAPTER EIGHT

8.1

CONCLUSION

On the whole, mothers' knowledge on diarrhoeal diseases is low. About 27% of the mothers knew the right causes of DD. The majority of the mothers were not able to recognize the signs of dehydration, although they correctly viewed DD as a dangerous disease. As many as 48% of the mothers were unable to mention more than two signs of dehydration.

Both SSS awareness and use were high while prepackaged ORS awareness and use were low. Knowledge on ORT was disappointingly low. Only 62.5% of the mothers scored more than 50% on ORT knowledge. Mothers' practices in the use of ORS was poor. There was a tendency for mothers to prepare hypertonic solutions, particularly with the use of SSS. Many mothers (28%) administered ORS in amounts which may not prevent or correct dehydration while 70% administered the fluids at a low frequency than what is recommended. One third of the mothers initiated ORT after the first day of illness. This may be too late, especially for acute cases of DD.

Mothers' attitude towards ORS was very positive. Nevertheless, the perceived role of ORT was erroneous for the majority of them. About three quarters of

the mothers subscribed to the "curative theory model" of ORT effectiveness. This belief is likely to deter continued use of ORS because the mothers expectations may not be realized.

Investigation on factors determining use of ORS was limited to two areas, namely characteristics of the mother and the DD episode. It was found that maternal characteristics (age, educational level, knowledge of ORT and understanding of the role of ORT) were more likely to influence past and correct use of ORS, in contrast to the actual DD episode characteristics such as severity and presence of concurrent illness. Among the DD episode characteristics only severity had a positive association with ORS use from the observation data. However, the sample size for this phase of the study was limited to 60. Probably with a larger sample, more associations might have been found.

In the course of the case studies, mothers' socio-cultural beliefs on the causation of DD appeared to play an important role in determining DD management although this aspect had not been included in the investigation.

8.2 RECOMMENDATIONS

Based on the findings and observation of the study, the following recommendations are made:

8.2.1 *Health Education*

There is an urgent need to develop health education intervention programmes in the area, with a view to examine the content of the messages which mothers are being exposed to and to verify the effectiveness of the methods of communication used. Mothers need continued advice on various aspects of DD to include; its causation, dangers and the signs of dehydration. It is assumed that repeated exposures to the messages will result into increased understanding and retention of the information.

Health education messages should not only aim at creating ORS awareness, but more importantly should emphasize the correct use of ORS. Instructions on ORS use should include its administration and the timing of initiation of ORT. Instructions on ORS preparation MUST include demonstrations in order for the mothers to visualize the amounts of ingredients to be used and to enable them to retain the information for a longer period of time. Where there is a home visiting programme, then a follow-up should be done so that the health workers further assist the mothers in the

preparation and administration of ORS. Studies have shown that for mothers to learn and retain this information, they need repetitive training (Kielmann et. al., 1986).

In addition, health messages should explain explicitly, the function of ORT. This study has shown that mothers who understood the role of ORT were more likely to use it correctly in terms of; timing of its initiation and volume of ORS administered. Nevertheless, social marketing messages on ORT, should not lose sight of the fact that the majority of the mothers' wish is to see the DD stop.

6.2.2 *Maternal Education*

There is need to uplift the educational levels of the mothers. Mothers of higher levels of formal education were more likely to understand the role of ORT and to initiate the therapy early. Therefore, efforts should be made to improve maternal literacy rate by promoting adult education classes and motivating women to attend them.

6.2.3 *Recommended Research*

1) An anthropological study is recommended which would explore the whole spectrum of factors (especially cultural factors) which may influence choice of treatment in managing DD. In particular,

the view that DD believed to be caused by teething cannot respond to ORT needs further investigation. The role that the male heads of households (fathers) play in deciding on the type of DD management is very crucial and should be investigated.

2) The observation phase of the study proved to be a more accurate method of obtaining information on the mothers' management of DD. Research using this method, on a larger sample size is therefore recommended.

3) A follow-up study of mothers who plan to use ORS in the future is recommended. This is very important in order to establish those factors which may have an influence on the continuous use of ORS. This method would show variability (if any) on how mothers manage different DD episodes.

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APPENDIX 1

SAMPLE SIZE IN CDD MORBIDITY AND MORTALITY SURVEYS*

The following formula is used to determine sample size:

$$n = \frac{z^2 (p.q)}{l^2}$$

In this formula: n= sample size

z=confidence limit factor (If 95%, z= 1.96:
If 90%, z= 1.65)

p= probability of occurrence of event being measures

q= probability of non-occurrence of event being measured, i.e., 1- p

l= limit of accuracy desired (i.e., l= ± x% of p)

Using this formula. the following sample sizes are needed:

Morbidity, Episode/ Child/year	Mortality, Death/1,000 Child/year	Morbidity, Episode/ Child/2 weeks and mortality, Death/ Child/year = p	l (± 25%) of p	n at 95% confi- dence	n at 90% confi- dence	l (± 10%) of p	n at 95% confi- dence	n at 90% confi- dence
7.0	269	.269	.0672	168	118	.0269	1044	740
6.0	230	.230	.0575	206	146	.0230	1284	911
5.5	211	.211	.0528	228	162	.0211	1437	1018
5.0	192	.192	.0480	259	186	.0192	1615	1144
4.5	173	.173	.0433	289	208	.0173	1838	1302
4.0	154	.154	.0385	334	240	.0154	2112	1497
3.5	135	.135	.0338	394	278	.0135	2464	1747
3.0	115	.115	.0288	471	334	.0115	2954	2055
2.8	108	.108	.0270	507	360	.0105	3173	2249

* Source: World Health Organization, (1981): "Manual for the Planning and Evaluation of National

CDD Prorammes, CDD/SER/81.5, Geneva. 23.

(Circle)

CLUSTER _____ A, B, C, D, E, F,

HOUSEHOLD NO. _____ DATE OF INTERVIEW _____

NAME OF HEAD OF HOUSEHOLD _____

NAME OF RESPONDENT _____

NAME OF INTERVIEWER _____

RELATION OF RESPONDENT TO HEAD OF HH _____

Ser NO.	Name	SEX m/f	D.O.B D : M : Y	CERT	AGE mos : yr	RELA to HH	RESID STATUS	MARITAL STATUS	OCCUPA TION	EDUC. LEVEL	APPROX. MONTHLY INCOME	ETHNIC GRP
1												
2												
3												
4												
5												
6												
7												
8												

CODE: Date of birth CERT: 1=Yes, 2= No

RESID. STATUS: 1= permanently resident for at least last 3 months, (indicate actual duration) 2= belongs to HH. works/goes to sch. elsewhere, comes infrequently, 3= less than 3 months, 8= No answer, 9= DNK

RELATION TO HH: 1= Head of HH, 2= wife/husband, 3=son/daughter, 4= parent, 5= other relative, 6=other non-relative, 8= No answer

MARITAL STATUS: 1= single, 2= married, 3= divorced, 4= separated, 5= widowed, 8= No answer, 9= DNK

OCCUPATION: 1= casual worker, 2= regularly employed, 3= self-employed, 4= goes to sch. 5= housewife, 6= no job, 8=no answer, 9= DNK

Appendix 2

KIBERA SURVEY FORM NO.1 (HOUSEHOLD PROFILE)

(Circle)

CLUSTER _____ A,B,C,D,E,F,

HOUSEHOLD NO. _____ DATE OF INTERVIEW _____

NAME OF HEAD OF HOUSEHOLD _____

NAME OF RESPONDENT _____

NAME OF INTERVIEWER _____

RELATION OF RESPONDENT TO HEAD OF HH _____

Ser NO.	Name	SEX m/f	D.O.B D M Y	CERT	AGE mos yr	RELA to HH	RESID STATUS	MARITAL STATUS	OCCUPA TION	EDUC. LEVEL	APPROX. MONTHLY INCOME	ETHNIC GRP
1												
2												
3												
4												
5												
6												
7												
8												

CODE: Date of birth CERT: 1=Yes, 2= No

RESID. STATUS: 1= permanently resident for at least last 3 months, (indicate actual duration) 2= belongs to HH, works/goes to sch. elsewhere, comes infrequently, 3= less than 3 months, 8= No answer, 9= DNK

RELATION TO HH: 1= Head of HH, 2= wife/husband, 3=son/daughter, 4= parent, 5= other relative, 6=other non-relative, 8= No answer

MARITAL STATUS: 1= single, 2= married, 3= divorced, 4= separated, 5= widowed, 8= No answer, 9= DNK

OCCUPATION: 1= casual worker, 2= regularly employed, 3= self-employed, 4= goes to sch. 5= housewife, 6= no job, 8=no answer, 9= DNK

Appendix 2

USE OF ORT IN KIBERA SLUM OF NAIROBI,
KENYA

FORM NO.2

Page 1 of 15

(Circle)
CLUSTER ----- A,B,C,D,E,F

HOUSEHOLD NO. : ___ : ___ : ___

NAME OF HEAD OF HOUSEHOLD _____

NAME OF INTERVIEWER _____

DATE OF SURVEY: : ___ : ___ : ___ : ___ : ___

NAME OF RESPONDENT: _____

RELATIONSHIP OF RESPONDENT TO THE CHILD: : ___

1= Biological mother

2= Father

3= Sibling

4= Grandmother

5= Other, please specify _____

NAME OF THE INDEX CHILD: _____

SEX OF THE CHILD: : ___

1= MALE

2= FEMALE

DATE OF BIRTH OF THE CHILD: : ___ : ___ : ___ : ___ : ___

DATE OF BIRTH VERIFIED: : ___ : 1= YES 2= NO

IF DATE OF BIRTH UNKNOWN:

APPROXIMATE AGE IN MONTHS: : ___ : ___

FORM NO.2

Page 2 of 15

(TO BE ADDRESSED TO THE INDEX MOTHER OR MOTHER
SUBSTITUTE)

MOTHER'S NAME: _____ ETHNIC GROUP _____

MOTHER'S AGE IN YEARS : ____ | ____ |

MOTHER'S EDUCATION BACKGROUND: (Number of years) | ____ |

MOTHER'S OCCUPATION : ____ |

1=Casual worker 2=Regularly employed

3=Self-employed 4=Housewife

MOTHER'S MONTHLY DISPOSABLE INCOME: | ____ | ____ | ____ | ____ |

DIARRHOEA KNOWLEDGE/ BELIEFS/ PRACTICES

1. Can you describe to me the symptoms of
diarrhoea.

1= Frequent watery stools 2= Vomiting

3= Fever 4= Weakness 5= Loss of appetite

6= Any other, specify _____

2. Can you describe to me how a child looks or what
happens to the child when diarrhoea continues for
more than three days?

1= Little amount of urine which is dark yellow
in colour

2= General weakness 3= Sunken fontanelle

4= Dry mouth and tongue 5= Skin loses elasticity

6= Sudden weight loss 7= Increased thirst

Form NO 2

Page 3 of 15

8= Sunken tearless eyes

9= Any other, specify _____

3. Do you think that diarrhoea can be harmful to a child?

1= YES 2= NO 3= Sometimes

IF YES or SOMETIMES, describe what can happen.

(Probe)

1= Cause death 2= Cause child to be weak

3= Cause dehydration (Loss of water in the body)

4= Cause child to be weak

5= Cause child to lose appetite

6= Any other, specify _____

4. What do you think causes diarrhoea?

1= Evil spirit/witchcraft/superstition

2= Unclean surroundings

3= Due to teething

4= Introduction of new foods

5= Eating of soil

6= When child starts crawling and walking

7= Eating too much food

8= Eating of food which does not agree with child

9= Eating of food which is not properly cooked

10= Do not know

11= Any other, specify _____

ORS KNOWLEDGE/ BELIEFS/ PRACTICES

5. How do you treat diarrhoea in young children?

1= Administer ORS packets 2= Administer SSS

3= Take child to health clinic 4=Administer herbs

5= Increase fluid intake (not ORS) 6=Restrict food

7= Decrease fluid intake

8= Any other, specify _____

Qns. 6 AND 7 TO BE USED TO PROBE MOTHERS WHO DO
NOT MENTION ORS ABOVE

6. Have you ever heard of any other methods for
treating diarrhoea?

1= YES 2= NO

IF YES, Which ones?

1= Administration of ORS packets

2= Administration of SSS

3= Administration of fluids other than ORS

4= Administration of drugs

5= Administration of herbs

6=Any other, specify _____

7. Do you treat diarrhoea at home?

1=YES 2=NO

IF YES, How do you treat it?

1= Use of ORS packets

Form NO 2

Page 5 of 15

2= Use of SSS

3= Use of fluids other than ORS

4= Use of drugs from shops

5= Use of health clinics

6= Use of herbs

7= Restriction of food

8= Any other, specify _____

(Qns. 8-10 TO BE ADDRESSED TO THOSE MOTHERS WHO
HAVE MENTIONED ORS ABOVE)

8a) Where did you first hear of ORS packets from?

1=From school

2=From mass media (radio, newsprint, posters)

3=From friends/relatives

4=From Village health worker

5=From health clinic/hospital

6=From shopkeeper

7=Any other, specify _____

b) Where did you first hear of SSS from?

1=From school

2=From mass media (radio, newsprint, posters)

3=From friends/relatives

4=From Village health worker

5=From health clinic/hospital

6=From shopkeeper

7=Any other, specify _____

9a) Did any body teach you how to use ORS packets?

1=YES 2=NO

IF YES, Who taught you?

1=At the clinic

2=Through mass media

3=Village health worker

4=The shopkeeper

5=A friend/relative

6=Any other, specify _____

9b) Did anybody demonstrate to you how to prepare ORS using packets?

1= YES 2= NO

IF YES, Who taught?

1= At the clinic

2= By Village health worker

3= A friend/relative

c) Did anybody teach you how to use SSS

1= YES 2= NO

IF YES, Who taught you?

1= At the clinic

2= Through mass media

3= Village health worker

4= The shopkeeper

5= A friend/relative

6= Any other, specify _____

d) Did anybody show you how to prepare SSS? !___!

1= YES

2= NO

IF YES, Who showed you?

1= At the clinic

2= Village health worker

3= A friend/relative

10.a) Have you ever used ORS packets? !___!

1=YES

2=NO

IF YES, How many times have you used it? !___!___!

IF NO, do you plan to use it in the future? !___!

1= YES

2= NO

b) Have you ever used SSS? !___!

1= YES

2= NO

IF YES, How many times have you used it? !___!___!

IF NO, do you plan to use it in the future? !___!

1= YES

2= NO

(IF ORS PACKETS AND SSS HAVE NOT BEEN USED, GO
STRAIGHT TO QN.11)

c) When was the last time you used ORS to treat
your child?

(Specify whether days, weeks or months. Enter 88
for cannot remember)

10d) Is ORS helpful? !___!

1= YES 2= NO

Form NO 2

Page 8 of 15

IF YES, How does ORS help your child when suffering from diarrhoea?

1=Replaces lost water from the body

2=It stops diarrhoea

3=It prevents thirst

4=It prevents weakness

5=It reduces DD

6=Makes child gain appetite

7=Any other, specify_____

11. Has any child below 3 years of age in this household had diarrhoea in the last seven days?

1=YES

2=NO

! _ !

12. Ask the mother to describe exactly how the last diarrhoea episode was like.

When the diarrhoea was worst what was the stool like?

(Write down exactly what mother says)

1=Watery

2= Yellow

3=Bloody

4= Milky

5=Green

6=Non-formed but not watery (like porridge)

7=Any other, specify_____

Form No 2

Page 9 of 15

For how many days did the diarrhoea episode last? !__!__!

What do you think was the cause of the diarrhoea?

- 1= Evil spirit/witchcraft/superstitions
- 2= Unclean surroundings
- 3= Due to teething
- 4= Introduction of new food
- 5= Eating too much food
- 6= Eating of food which does not agree with child
- 7= Child started crawling/ walking
- 8= Do not know
- 9= Any other, specify_____

13a) When your child had the last attack of diarrhoea, did you use ORS? !__!

1=YES 2= NO

b) IF YES, What form of ORS did you use? !__!

- 1= ORS packets
- 2= Salt sugar solution
- 3= Both

c) IF NO, Why did you not use it? !__!

- 1= Never heard of it
- 2= Child does not like the taste
- 3= ORS not helpful from past experience
- 4= ORS packets too expensive

Form NO 2

Page 10 of 15

- 5= Salt/sugar too expensive
- 6= ORS packets not available
- 7= DD episode not serious
- 8= Not suitable for type of DD
- 9= Any other, specify _____

(Qns. 14-30 TO BE ADDRESSED TO THOSE MOTHERS WHO HAVE USED ORS IN THE PAST)

14. Why did you use ORS?

- 1= To replace lost water from the body
- 2= To prevent diarrhoea
- 3= To prevent weakness
- 4= Given at the hospital/ advised by health personnel
- 5= Any other, specify _____

15. What was the outcome of the treatment? : ____!

- 1= Improved
- 2= Stayed the same
- 3= Became worse
- 4= Do not know
- 5= Any other, specify _____

(Qn. 16 TO BE ASKED OF THOSE MOTHERS WHO HAVE USED BOTH TYPES OF ORS)

Form NO 2

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16. Which form of ORS do you prefer? !__!

1= ORS packets

2= Salt sugar solution

3= Both are the same

4= Do not know

5= Any other, specify _____

(IF ANY OF THE FORMS IS PREFERRED THEN ASK FOR THE REASON)

Why do you prefer this type of ORS? !__!

1= Easier to prepare

2= More effective

3= Easily available

4= Less expensive

5= Any other, specify _____

17. How would you prepare the packet ORS?

(Write down all the steps and the amount of ingredients as quoted by the mother)

(Ask mother what size of packet she used)!__!

1= Correct 2= Incorrect !__!

IF INCORRECT:

1= Too much mixture used

2= Too little mixture used

Form No 2

Page 12 of 15

18. How would you prepare the salt sugar solution?

(Write down all the steps and the amounts of ingredients as quoted by the mother)

1= Correct

2= Incorrect : ____!

IF INCORRECT:

1=Too much salt 2=Too little salt

19. How did you store the prepared solution?

1= In a covered container

2= In an uncovered container

3= Poured the remaining solution

4= Any other, specify _____

20. How frequently did you prepare the solution?

1= Once in a day

2= Twice a day

3= Once in two days

4= Once in a week

5= Any other, specify _____

21. When did you start giving ORS? : ____!

1= Immediately

2= Not immediately

IF IMMEDIATELY, Why? : ____!

1= To prevent dehydration

2= To prevent diarrhoea from getting worse

3= Any other, specify _____

Form NO 2

Page 13 of 15

IF NOT IMMEDIATELY, Why? :___:

1= To ensure that it is a diarrhoea episode

2= To determine the severity

3= Did not know of ORS before taking child to
hospital/clinic after some days of diarrhoea

4= Any other, specify _____

After how many days did you start giving ORS

:___:

22. How much of the ORS did you give to the child
in every 24 hours? :___:___:___:___:

23. How frequently did you give ORS? :___:

24. How much of ORS did you give at each time of
administration? :___:___:

25. When did you stop giving ORS? :___:

1= When diarrhoea stopped

2= One to two days after diarrhoea stopped

3= During DD (No change with ORS)

4= Any other, specify _____

26. Do your children like the taste of ORS? :___:

1= YES

2= NO

IF NO, What do you do? :___:

1= Force child to take it

2= Stop giving the child ORS

3= Any other, specify _____

Form No 2

Page 14 of 15

27. Where can ORS packets be obtained? :___:

1= From health clinics/hospitals

2= From the shops

3= Do not know

4= Any other, specify_____

28. If ORS is available in the shops, how much do they cost?

DO you consider them expensive? :___:

1= YES 2= NO

3= Any other, specify_____

29. Are the packets easily available in the locality? :___:

1=YES 2=NO

3= Any other, specify_____

30a) Did you give any other treatment apart from ORS? :___:

1= YES 2= NO

IF YES, WHY? :___:

1=ORS alone is not effective

2= No ORS available in the locality

3= Any other, specify_____

30b) What treatment did you give? (___)

1= Drugs from the hospital/ clinic

2= Drugs from the shops

3= used herbs

4= Any other, specify _____

c) If drugs were used, what was the source? (___)

1= Health centre/ hospital

2= Private Doctor

3= Shops

4= Any other, specify _____

d) If herbs were used, what was the source? (___)

1= Given by friends and relatives

2= Picked by mother

3= Prescribed by herbalists

4= Any other, specify _____

31. Do you plan to use ORS in the future? (___)

1= YES

2= NO

3= Will depend on type of DD

IF NO, Why? (___)

1= ORS not helpful from past experience

2= Child does not like the taste of ORS

3= Any other, specify _____

USE OF ORT IN KIBERA SLUM OF NAIROBI, KENYA.

(Form NO. 3)

Page 1 of 4

(TO BE ADMINISTERED TO MOTHERS WHOSE CHILDREN
DEVELOP DIARRHOEA AND WHO HAVE BEEN IDENTIFIED AS
CURRENT USERS OF ORS, DURING OBSERVATION OF A DD
EPISODE)

(Circle the response as appropriate)

CLUSTER A,B,C,D,E,F

HOUSEHOLD NO. : ___:___:___

NAME OF HEAD OF HOUSEHOLD: _____

NAME OF INTERVIEWER: _____

DATE OF SURVEY: :___:___:___:___:___:___

NAME OF RESPONDENT _____

RELATIONSHIP OF RESPONDENT TO CHILD: :___:

1= Biological mother 2= Father

3= Sibling 4= Grandmother

5= Other, please specify _____

NAME OF THE INDEX CHILD: _____

SEX OF THE CHILD :___:

1= MALE

2= FEMALE

AGE OF CHILD :___:___:___

OBSERVATION

DATE FOLLOWING BEGAN: :___:___:___:___:___:___

DATE DIARRHOEA EPISODE STARTED:

:___:___:___:___:___:___

DAY OF EPISODE _____

Form NO 3

Page 2 of 4

(Day 1, DAY 2 etc.)

DAY OF OBSERVATION _____

DESCRIPTION OF STOOL/ EPISODE

1) Number of stools passed per day :__:

2) Colour of stool :__:

1= Yellow 2= Green 3= Milky

4= Any other, specify _____

3) Consistency of the stool :__:

1= Watery 2= Has bits and pieces

3= Non-formed porridge like

4= Any other, specify _____

4) Presence of blood or mucous in the stool :__:

1= YES 2= NO

5. Are there any other signs of illness? :__:

IF YES, What signs?

1= Vomiting 2= Fever

3= Other signs, specify _____

MANAGEMENT OF DIARRHOEA

6. What was the first action you took against your child's diarrhoea? :__:

1= Increase fluid intake (NOT ORS)

2= Decrease fluid intake

3= Administer ORS packets

Form NO 3

Page 3 of 4

4= Administer SSS

5= Took child to clinic

6= Stop all food

7= Stop breast feeding

8= Gave medicine

9= Restrict food

10= Any other, specify _____

7.a) Are you giving the child ORS? :___!

1= YES 2= NO

b) IF YES, When did you start giving ORS? :___!

1= On the day diarrhoea started

2= A day after diarrhoea started

3= Two days after diarrhoea started

4= Any other, specify _____

c) IF NOT, Why not? :___!

1= Diarrhoea not severe

2= No money

3= No time to get packets

4= Not the kind of DD to be treated with ORS

5= Any other, specify _____

8) Type of ORS being given to the child :___!

1= ORS packets 2= Salt sugar solution

3= Both

9a) Is the child being given any other treatment apart from ORS? 1= YES 2= NO :___!

Form NO 3

Page 4 of 4

b) IF YES, What treatment is being given? :___:

1=drugs 2= Herbs/traditional treatment

3= Increase Home fluids

4= Any other, specify_____

c) If drugs are used, what is the source? :___:

1= Hospital/health centre

2= Private doctor

3= Shops

4= Any other, specify_____

d) If herbs are used, what is the source? :___:

1= Given by friends or relatives

2= Picked by mother

3= Prescribed by herbalist

4= Any other, specify_____

COMMENTS

HOUSEHOLD NO. : : :

NAME OF INTERVIEWER: _____

RELATIONSHIP OF RESPONDENT TO CHILD: _____

DAY _____ OF ILLNESS DAY _____ OF OBSERVATION

TIME am :pm	ORS ADMINISTRATION amount (mls)	ORS PREPARATION	ORS STORAGE	BREAST FEEDING	OTHER FOOD	MEDICINE Name :source

ORS PREPARATION: 1= ORS packets, 2= SSS

Appendix 3 _____ Weighted Score System used in
Determining Mothers Knowledge
on ORT

Areas	Answers and points awarded
ORS awareness	2
Understanding of ORT	4
Preparation of ORS (proportion of water to salt)	6
Initiation of rehydration on the first day of episode	4
Storage condition of the solution (covered or not)	1
Volume of ORS administered per day:	
Less than 200 mls	0
200 to 600 mls	2
Over 600 mls	4
Frequency of ORS administration per day:	
Once or twice	0
Three times	2
More than three times	4
Source of ORS sachets:	
Shops only	1
Health facility only	1
Shops and health facility	2

Appendix 4

Weighted Score System used
in determining Mothers
Practices in the
utilization of ORT.

Area		Answers and Points awarded

1. Initiation of rehydration on first day of episode		4
2. Sodium content of rehydration solutions:	Less than 50 and more than 100 mmols /l	0
	Between 50 to 100 mmols/l	6
3. Use of ORS:	Users	12
	Non-users	0
4. Frequency of ORS administration:	Once or twice per day	0
	Three times per day	2
	Four times per day	3
	Five times per day	4
5. Volume of ORS administered per day:	Less than 200 mls	0
	200 to 600 mls	3
	More than 600 mls	6

APPENDIX 5

CORRELATIONS BETWEEN INDEPENDENT AND DEPENDENT VARIABLES ON ORS
UTILIZATION FROM OBSERVATION DATA (n=60)

DEPENDENT VARIABLES

INDEPENDENT VARIABLES	Use of ORS n=60	Timing of initiation of ORT n=42	Frequency of ORS adminstr- ation n=42	Preparation of ORS n=42	Volume of ORS admini- stered n=42	Computed practice score n=60
Mother's age	NS	NS	NS	NS	NS	NS
Mother's Education	.2203+	NS	NS	NS	NS	NS
Mother's disposable Income	NS					
ORT Model	NS	NS	NS		NS	
Knowledge of ORT	.9282**					
Age of child	NS	NS		NS		
Severity	.2645+	NS	NS		NS	
Other illness	NS	NS	NS		NS	

NS = Not significant

** = P<0.001

* = p<0.01

+ = P<0.05

Appendix 6

Case Study 1

Sylvia, girl aged 8 months.

Sylvia is the eighth child in her family. The family has lived in Kibera for 20 years. They come from Uganda. Sylvia's father is a casual worker. He has had 7 years of formal education while his wife has had none.

Sylvia is fully immunized for her age. She has been suffering frequently from pneumonia although she looks healthy. Diarrhoea has not been common in the child. Sylvia's mother is aware of only SSS. She was taught verbally how to mix the solution. She was instructed to mix one level teaspoon of sugar and two pinches of salt in a glass of water. She was not advised on how much of the solution to give per day nor the frequency of administration. She was, however, advised to start giving SSS to the child on onset of diarrhoea before going to the hospital. The mother knew that SSS replaces lost water from the body. However, she does not believe that SSS alone without the use of water to which glucose has been

Real names in this and subsequent case studies have been substituted.

added or drugs is effective in treating diarrhoea. She believes (correctly) that SSS is only useful for watery or severe diarrhoea. She plans to use SSS in the future but in combination with drugs.

We started observing Sylvia on the second day of diarrhoea illness. The first action that the mother took against the DD episode on the first day of illness was to administer SSS. On the same day she took Sylvia to Lang'ata Health Centre but got no treatment because there was no medicine available. The mother continued giving SSS and also started giving glucose water. On this first day of observation, she gave the child SSS once (about 100 mls) and glucose twice (about 80 mls). The child passed nine watery stools and also had fever.

On the second day of observation, the mother continued to administer SSS and glucose water. She gave approximately the same quantities of both solutions as the previous day. The child passed 6 watery stools on this day.

The mother continued to administer both the solutions for the next two days. She stopped giving the solutions when the child's stools became of normal consistency. The mother believed that SSS was only effective this time because she used it in

combination with glucose water. She did not know the cause of the DD episode.

Comments

Here is a case in which the mother knows that SSS replaces lost water from the body during DD but does not believe that any treatment which does not stop DD is effective. This is a clear demonstration of the mother's paramount desire to see the DD stop.

Case study 2

Ochieng, boy aged 9 months

Ochieng is the third child of Odhiambo and Atieno. The family comes from Kisumu district, in Nyanza province. Ochieng's father has been living in Kibera for the last three months while his wife and the children have been in Kibera for one and a half months. Ochieng's father is 30 years old and has had up to secondary level of education. He is regularly employed and earns a monthly salary KShs. 1500/=. His wife is 22 years old and has had up to primary level of education. She is engaged in a small scale business of selling vegetables. She earns approximately Kshs. 840/= per month.

Ochieng' looks unhealthy, not well nourished, unhappy and irritable. The child has been unhealthy from the age of 7 months, when he started having recurrent

bouts of DD.

The mother is aware of both SSS and prepackaged ORS. She first heard of them from a village health worker while living in Kisumu district. She was taught verbally how to prepare the solutions. In her opinion, both types of ORS are equally effective in replacing lost water from the body. She believes that ORS cannot treat DD caused by factors related to superstition. For this kind of DD one ought to be cleansed by elders. Cholera and DD caused by teething cannot be treated with ORS either. The mother indicated that she uses drugs and herbs together with ORS for these types of DD. The mother knows the correct methods of preparing both types of ORS. She reported that ORS packets are not easily available in the health centres in and around Kibera.

We started following Ochieng' on the third day of illness. On this day he passed 4 yellow, watery stools with a bit of mucus. He was vomiting and was very weak and irritable. The mother was restricting breast feeding because the child vomited every time she breast fed him. The only food that the child was given was millet porridge. He took about 200 mls of prepackaged ORS which he had been given at the catholic-church-run health centre in Laini Saba the previous day. The mother had taken part in the

preparation of the solution. In addition, she was giving Ochieng' septrin, piriton and a red syrup (name unknown) which had also been given at the health centre. The mother was also administering three herbs; one to soothe the gums, another to relieve stomach ache and the other to weaken an active "worm" in the stomach.

On the second day of observation, Ochieng' passed 3 yellow stools which had bits and pieces with mucus in it. The child was still vomiting and weak. The mother continued to give ORS which she prepared correctly as she had been instructed at the health centre. She gave only 120 mls of the solution. She also gave the medicine from the health centre, the herbs and in addition used Ashton powder to soothe the child's gums. The child was not breast feeding on this day either. He was only fed on millet porridge to which some glucose had been added, which he hardly took.

~~On the next three days,~~ Ochieng' passed only one semi-solid stool per day. The mother continued to give ORS, the medicine and the herbs. The child took an average of 150 mls of ORS per day. However, Ochieng' was still looking very weak and was beginning to develop white sores in the mouth.

The following day Ochieng' passed only one stool of

normal consistency. The mother continued to administer the drugs, herbs and ORS. For the first time in five days the child breast fed and ate a little food without vomiting. However, the mother was still not happy with the general condition of the child. She was now doubting whether the child's condition was caused by teething alone. She reported that a friend from the Luhya tribe had diagnosed the condition as being caused by Luhya witchcraft (evil eye). The friend gave her some herb to help clear the sores in the mouth and to improve his general condition.

The following day the mother started using the herb and stopped giving the medicine and ORS.

Five days later, we found Ochieng playing happily. He was now eating and breast feeding normally, thanks to the friend who had diagnosed his condition. His mother was fully convinced that her child had been bewitched and that the herb given by her friend had helped him recover. Ochieng's family was urgently looking for another house to move into because on the plot where they were living, there were very many Luhya neighbours.

Comments

This is a case where the mother's cultural beliefs

made her stop using ORS and drugs during a DD episode. Given that the child's condition improved after the mother administered the herb which was given by her friend to counteract the effect of the witchcraft, the mother is likely not to use ORS for DD cases which are believed to be related to witchcraft.

Case study 3

Jerusha, girl aged 8 months.

Jerusha is the third child of Joshua and Beatrice. Jerusha's father, is 27 years old and of primary level of education. He has stayed in Kibera for three years. He is employed as a casual worker. Jerusha's mother is 23 years old and comes to Kibera infrequently from their rural home in Kakamega district to visit her husband.

Jerusha is fully immunized for her age. She looks healthy and fairly active. According to the mother, she has had no history of illness apart from the the current DD episode which we observed.

Jerusha's mother is aware of both prepackaged ORS and SSS. She first heard of prepackaged ORS from a clinic in Kakamega district. She was taught verbally how to prepare the solution. She has used prepackaged ORS only once, but does not know how to prepare the

solution correctly.

Jerusha's mother first heard of SSS from her own mother who taught her how to prepare and administer it. She does not know how to prepare the solution correctly. She has used SSS many times. Since she has used prepackaged ORS only once, she cannot make a judgment on which type of ORS she prefers.

The mother believes that ORS reduces DD but cannot completely cure it without the use of drugs. She also believes that ORS is not effective in treating DD caused by teething. She says, "Yes, I will continue to use ORS when the DD is an illness, but if it is due to teething then there is no need as it will not be effective".

We started following Jerusha on the third day of illness. On this day, she passed 4 yellow stools which had mucus. She also had a running nose. The mother did not give any treatment because she thought that the DD was not severe since it was caused by teething. The child was breast feeding and eating as usual. We followed Jerusha for the next two days, after which she seemed to have fully recovered. The mother took no action at all against the DD.

Comments

Jerusha's mother did not use ORS because of her

cultural beliefs on the causation of DD. She believes that DD caused by teething is not an illness and therefore does not warrant any treatment. In any case ORS is not effective in treating this type of DD.

Case study 4

Henry, boy aged 8 months

Henry is the fourth child of Wilson and Serah. The family comes from Western province of Kenya. Henry's father was educated up to secondary form 2 and the mother has had six years of formal education. The family has lived in Kibera for 8 years. Henry's father is regularly employed as a mechanic. His mother is a housewife but owns a shamba near Kibera where she plants a variety of vegetables for the family's consumption.

Henry is fully immunized for his age. He looks very well nourished. However, the mother says that the child falls sick very frequently, suffering from DD and cough.

Henry's mother is aware of both SSS and prepackaged ORS. She first heard of prepackaged ORS from friends and SSS from Lang'ata health centre, where she was taught verbally how to prepare the solution. She was not advised on the administration of the solution.

The mother was given a demonstration on the preparation of prepackaged ORS at the Ministry of Health Nutrition Clinic in Kibera. She has used this type of ORS only once. She believes that SSS prevents weakness while prepackaged ORS stops DD. Prepackaged ORS can therefore be effective in treating DD without the use of drugs. She, however, says that both types of ORS are not helpful for DD caused by teething. For this type of DD, she takes the child to a health centre where an anti-diarrhoeal mixture is usually prescribed.

We started following Henry on the third day of illness. The first action that the mother took on the onset of DD was to administer SSS. On this day, he passed 4 watery stools which had mucus. The child was also suffering from a cough. The mother was giving him both SSS and drugs which had been prescribed for him at a private clinic the previous day. The child had lost appetite and was only breast feeding and taking maize-meal porridge. On this day the child took about 500 mls of SSS to which the mother added too much salt. The child liked the taste of the SSS and took it without being forced. The mother prepared the solution twice and kept it covered in a thermos flask.

On the second day of observation, Henry passed 4

stools of the same consistency and colour as the previous day. The mother only gave 75 mls of SSS as she was away in the shamba the whole morning. The mother continued to give the drugs. Henry had not yet regained his appetite.

On the next two days the mother continued to give both the drugs and SSS. She gave an average of 180 mls SSS per day.

The following day, Henry's condition became worse. He passed very many watery stools. The mother took the child to a private clinic where an anti-diarrhoeal mixture and a reddish syrup of unknown name were given. She paid KShs. 30/= both for consultation and the prescribed drugs.

On the following day, the child's condition continued to deteriorate as he was now also vomiting. The mother gave SSS once but decided to stop giving it altogether because the child vomited as soon as it took the solution. The child was only breast feeding and was not even taking the porridge he had been taking before. The mother gave the medicine which had been prescribed the previous day. She now believed that the DD had been caused by teething and that is why the SSS was not helpful.

The following day the mother decided to take Henry

back to the clinic he had been taken to earlier. The child was given a yellow syrup and pink tablets of unknown names. The mother was also advised to give SSS. Henry had not yet regained appetite and was only breast feeding. The mother was giving SSS to which too little salt had been added.

We followed Henry for the next five days. During this period, his condition improved. The mother continued to give the drugs but not SSS because the child vomited every time he took the solution.

Comments

This is a case where a mother uses SSS intermittently during a DD episode because of several reasons. She does not understand the function of ORS in terms of rehydration and therefore when the DD failed to stop, she then attributed it to teething and temporarily stopped using SSS. The cultural context of DD influenced the mother's choice of the mode of treatment selected for managing a DD episode.

Case study 5

mael, boy aged 24 months.

Ismael is the fifth child of Hezron and Merisa. He has three sisters and one brother. The family comes from Kakamega district in Western province. Ismael's

father has had 8 years of education and is self employed as a shoe maker. The wife does not know how much he earns. Ismael's mother has had 4 years of formal education. She is employed to sell water for a neighbor who has rented a water meter from the City Commission. She earns KShs. 350/= per month.

Ismael has been fully immunized. He looks healthy and very active. The mother reported that the child has been very healthy until he reached the age of 9 months when he started getting frequent attacks of malaria and DD.

Ismael's mother is aware of both SSS and prepackaged ORS. She first heard of SSS at a health centre in Kakamega district, where she was taught verbally how to prepare it. She has used SSS very many times.

She first heard of prepackaged ORS, from a friend who gave her verbal instructions on how to prepare and use it. The mother believes that both types of ORS replace lost water from the body as well as stop DD. She believes that prepackaged ORS can help stop all types of DD. SSS takes a longer time to stop DD than prepackaged ORS. She also believes that both types of ORS can treat certain types of DD without the use of medicine.

We started following Ismael on ~~the~~ third day of

illness. On this day he passed 3 yellow and watery stools. He was also having a running nose. The mother took no action against either DD or the cold.

On the second day of observation, Ismael passed six semi-solid stools. Again on this day the mother took no action against the DD. We visited Ismael's mother every day for seven days. After this period the stopped. The mother reported that she did not take any action because she believed that the DD was caused by malaria "in the stomach". She therefore thought that if the child "could diarrhoea all the malaria from the stomach", then the DD would disappear completely. When we asked her why she did not use ORS for the present DD episode she replied, "How can I use ORS for a child who is above one year old? He is too old, ORS would not have any effect on him".

Comments

This case study serves to illustrate how a mother's belief on ORT can influence her decision on the mode of treatment to use. The mother wrongly believes that ORT is only suitable for infants and is therefore not effective for older children.

Case study 6

Rahama, boy aged 18 months

Rahama is the fifth child of Irkil and Halima. The family has lived in Kibera for the last 11 years. They come from Moyale in Eastern province and belong to the Boran ethnic group. Rahama's father is 35 years old and has had up to primary 7 level of education. He is permanently employed as a factory guard and earns KShs. 1200 per month. The family has no other sources of income. Rahama's mother who is 25 years old has never had any formal education. She is housewife but has a disposable income of KShs. 1200 per month as the husband gives her all his salary to manage the household.

Rahama looks quite healthy and feeds very well according to the mother. He has not yet received his measles vaccination because he has been suffering from a severe cough. His mother reported that suffers from stomach pains very frequently.

Rahama's mother is aware only of SSS, which she first heard of at the Ministry of health Nutrition clinic in Kibera. She believes that SSS has the dual function of replacing lost water from the body during DD and vomiting and that it also stops DD. She also believes that SSS is only helpful if the child is suffering from dd without having a stomach upset. She

reported that she was instructed to give the solution instead of milk and at the same frequency in which she would give the milk. She was not given instructions on the amount of SSS to give at each time of administration nor the amount to give per day.

We started following Rahama on the second day of illness. Rahama passed 4 watery yellow stools which had mucus. The mother did not take any action against the DD.

On the second day of observation, Rahama passed 3 watery yellow stools. Again, no action was taken against the DD. We continued our follow up for the next 3 days after which she recovered. The mother took no action against the DD. She reported that she did not use SSS because it had not proved to be effective from past experience. She did not take the child to a health centre because she had no money to pay at a private clinic. She did not take Rahama to a government health centre because many times she has gone there but received no treatment.

Comments

Here is a case in which a mother does not use SSS because it was not effective from past experience as it did not stop DD.

Case study 7

Kamada, boy aged 12 months

Kamada's family comes from Moyale in the eastern part of Kenya. They have lived in Kibera for 11 years. Kamada is the third and youngest child of Nabla and Halima. Kamada's parents have not had any formal education. His father works as a watchman and earns Kshs. 800 per month. He gives his salary to his wife to run the household.

Kamada looks very healthy and the mother reported that he has been of good health. The child is still breast feeding but also feeds from the family pot.

Kamada's mother is only aware of SSS. She knows that it replaces lost water from the body and prevents weakness. She first heard of it at Woodley Clinic in Kibera where she received instructions on its preparation by demonstration. She was advised to administer the solution as frequently as possible and that the child should take approximately 1000 mls of the solution per day. She however, does not give SSS when the DD is accompanied by vomiting because it induces a child to vomit more and therefore makes him weaker. She believes that SSS is not effective on its own without the use of drugs.

We started following Kamada on the second day of illness. The mother's first action was to give SSS on the first day of illness. When we visited the household on the second day of episode we found the mother still administering the solution. She gave about 5 dessertspoons of SSS twice in the day. Every time she gave the solution the child vomited. After the second attempt, she decided not to give the solution any more. The child passed four watery stools which had mucus. The child had no appetite and was only breast feeding.

On the second day of observation, Kamada passed 3 watery stools. The mother took no action against the illness. The child still had no appetite and only breast fed throughout the day.

During the next five days, Kamada passed 3 watery stools, on average per day. The mother took no action against the illness during this period. She believed that the DD was not severe enough to warrant taking the child to hospital.

Comments

This case study exemplifies a situation whereby the mother understands ORT but stops using it in the middle of an episode, because she believes that it is inducing vomiting in the child therefore making him

very weak. She is disillusioned with it and thus stops using it.
